

126-DRI-12-004
SAFETY COMPLIANCE TESTING FOR FMVSS 126
Electronic Stability Control Systems

Nissan Motor Co., Ltd.
2012 Infiniti QX56
NHTSA No. CC5202

DYNAMIC RESEARCH, INC.
355 Van Ness Avenue, STE 200
Torrance, California 90501



2 July 2012
Final Report

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National Highway Traffic Safety Administration
New Car Assessment Program (NCAP)
and
Enforcement
Office of Vehicle Safety Compliance
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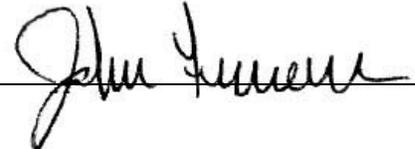
If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement.

Prepared By: John Lenkeit

Approved By: Peter Broen

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1. PURPOSE OF COMPLIANCE TEST

The purpose of this test is to determine if the test vehicle, a 2012 Infiniti QX56, meets the minimum equipment and performance requirements stated in Federal Motor Vehicle Safety Standard (FMVSS) 126, "Electronic Stability Control Systems." The vehicle was tested in 2WD drive configuration.

2. TEST PROCEDURE AND DISCUSSION OF RESULTS

Testing of the 2012 Infiniti QX56 was conducted at Dynamic Research, Inc (DRI) in accordance with NHTSA TP-126-03, dated September 9, 2011.

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

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

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

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

2. TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTINUED)

- At 1.75 seconds after completion of a required Sine with Dwell steering input, the yaw rate of the vehicle must not exceed 20 percent of the first peak value of yaw rate recorded after the steering wheel angle changes sign (between first and second peaks during the same test run).
- For steering inputs of scalar 5 and greater, the lateral displacement of the vehicle center of gravity with respect to its initial straight path must be at least 1.83 m (6 feet) (for vehicles with a GVWR of 3,500 kg (7,716 lb) or less) when computed 1.07 seconds after the Beginning of Steer (BOS) at the specified steering wheel angles.

System malfunction simulations were executed to verify vehicle could identify and indicate a malfunction. System related "malfunction" and "Off" telltales, and related controls were inspected for required identification and labeling.

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. TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTINUED)

DATA SUMMARY SHEET (1 of 2)

VEHICLE MAKE/MODEL/BODY STYLE: 2012 Infiniti QX56

VEHICLE NHTSA NO.: CC5202 VIN: JN8AZ2NF9C9517577

VEHICLE TYPE: MPV DATE OF MANUFACTURE: 2/12

LABORATORY: Dynamic Research Inc.

REQUIREMENTS

PASS/FAIL

ESC Equipment and Operational Characteristics (Data Sheet 2)

The vehicle is equipped with an ESC system that meets the equipment and operational characteristics requirements. (S126, S5.1, S5.6)

PASS

ESC Malfunction Telltale – Location, Labeling and Bulb Check (Data Sheet 3)

Telltale meets the requirements for mounting, symbol or text, color and check of lamp function (S126, S5.3.1, S5.3.2, S5.3.4, S5.3.5, S5.3.6 and S5.3.8)

PASS

“ESC Off” and other System Controls and Telltale (Data Sheet 3 & 4)

If provided, telltale meets the requirements for mounting, symbol or text, color and check of lamp function . (S126, S5.5.1, S5.5.2, S5.5.3, S5.5.6, S5.5.7 and S5.5.8)

PASS

If provided, off control meets the label requirements (S126, S5.4.3)

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, S5.4.4, S5.5.4, and S5.5.9)

PASS

2. TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTINUED)

DATA SUMMARY SHEET (2 of 2)

REQUIREMENTS

PASS/FAIL

Vehicle Lateral Stability (Data Sheet 8)

Yaw Rate Ratio at 1 second after COS is less than 35% of peak value.
(S126, S5.2.1)

PASS

Yaw Rate Ratio at 1.75 seconds after COS is less than 20% of peak value. (S126, S5.2.2)

PASS

Vehicle Responsiveness (Data Sheet 8)

Lateral displacement at 1.07 seconds after BOS is at least 1.83 m (6 feet) for vehicles with a GVWR of 3,500kg (7,716 lb) or less, and 1.52 m (5 feet) for vehicles with a GVWR greater than 3,500 kg (7,716 lb). (S126 S5.2.3)

PASS

ESC Malfunction Warning (Data Sheet 9)

Warning is provided to driver after malfunction occurrence.
(S126. S5.3.3)

PASS

Malfunction telltale stayed illuminated for as long as the malfunction existed and extinguished after the malfunction was corrected.
(S126, S5.3.3 and S5.3.7)

PASS

3. TEST DATA

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

VEHICLE MAKE/MODEL/BODY STYLE: 2012 Infiniti QX56

VEHICLE NHTSA NO.: CC5202 TEST DATE: 5/7/2012

VIN: JN8AZ2NF9C9517577 DATE OF MANUFACTURE: 2/12

GVWR: 3311 kg FRONT GAWR: 1640 kg REAR GAWR: 1971 kg

SEATING POSITIONS: FRONT 2 MID 5 REAR

ODOMETER READING AT START OF TEST: 13 miles (20.8 km)

DESIGNATED TIRE SIZE(S) FROM VEHICLE LABELING:

Front Axle P275/50R22 Rear Axle P275/50R22

INSTALLED TIRE SIZE(S) ON VEHICLE:

<u>From Tire Sidewall</u>	<u>Front Axle</u>	<u>Rear Axle</u>
Manufacturer & Tire Name	<u>Bridgestone Dueler H/T 684 II</u>	<u>Bridgestone Dueler H/T 684 II</u>
Tire Size Designation	<u>P275/50R22</u>	<u>P275/50R22</u>

TIN: Front Left RLRP DJC 0512 Front Right RLRP DJC 0512

Rear Left RLRP DJC 0512 Rear Right RLRP DJC 0512

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

DRIVE CONFIGURATION(S): (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)
- Four Wheel Drive High Gear Locked Differential (4WD HGLD)
- Four Wheel Drive Low Gear (4WD Low)
- Other (define) _____

3. TEST DATAcontinued

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

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

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

Drive Configuration RWD

Mode(s) VDC (ESC) On or Off

Drive Configuration _____

Mode(s) _____

Drive Configuration _____

Mode(s) _____

VEHICLE STABILITY SYSTEMS (Check applicable technologies):

ESC

Traction Control

Roll Stability Control

Active Suspension

Electronic Throttle Control

Active Steering

ABS

List other systems: _____

Remarks:

Recorded by: P Broen Date: 5/7/2012

Approved by: J Lenkeit 5/15/2012

3. TEST DATAcontinued

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

VEHICLE MAKE/MODEL/BODY STYLE: 2012 Infiniti QX56

VEHICLE NHTSA NO.: CC5202 TEST DATE: 5/8/2012

ESC SYSTEM IDENTIFICATION

Manufacturer/Model: ADVICS Co., Ltd. / HB-Ci

ESC SYSTEM HARDWARE (Check applicable hardware):

- | | |
|---|---|
| <input checked="" type="checkbox"/> Electronic Control Unit | <input checked="" type="checkbox"/> Hydraulic Control Unit |
| <input checked="" type="checkbox"/> Wheel Speed Sensors | <input checked="" type="checkbox"/> Steering Angle Sensor |
| <input checked="" type="checkbox"/> Yaw Rate Sensor | <input checked="" type="checkbox"/> Lateral Acceleration Sensor |

List other components: _____

ESC SYSTEM OPERATIONAL CHARACTERISTICS:

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

Brief explanation with reference to components used:

The vehicle control unit for the VDC function switches brake fluid pressure of each brake caliper to increase, hold or decrease pressure according to signals from the ABS actuator and electric control unit.

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

Brief explanation with reference to components used:

Yaw rate is measured directly by a yaw rate sensor

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

Brief explanation with reference to components used:

Steering wheel angle is measured directly by a steering angle sensor

System is capable of estimating side slip or side slip derivative Yes (PASS)
 No (FAIL)

Brief explanation with reference to data collected and method used:

Vehicle sideslip is estimated from five inputs including yaw rate, wheel speed, longitudinal acceleration, lateral acceleration and steering wheel angle

3. TEST DATAcontinued

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

ESC SYSTEM OPERATIONAL CHARACTERISTICS (continued):

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

Brief explanation of method used to modify engine torque:
The engine controller module will receive the engine torque request from the ESC controller unit and modifies the engine torque by differentiating the throttle opening and fuel delivery.

System is capable of activation at speeds of 20 km/h (12.4 mph) and higher. Yes (PASS)
 No (FAIL)

Speed system becomes active: 10 km/h

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

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

DATA INDICATES COMPLIANCE PASS/FAIL **Pass**

Remarks:

Recorded by: P Broen Date: 5/8/2012

Approved by: B Kebschull Date: 5/8/2012

3. TEST DATAcontinued

DATA SHEET 3 (Page 1 of 4)
ESC MALFUNCTION AND OFF TELLTALES
Location, Labeling and Bulb Check

VEHICLE MAKE/MODEL/BODY STYLE: 2012 Infiniti QX56

VEHICLE NHTSA NO. CC5202

TEST DATE: 5/4/2012

ESC Malfunction Telltale

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

Telltale Location Top center portion of instrument panel

(see Figure 5.13)

Telltale is mounted inside the occupant compartment in front of and in clear view of the driver? Yes (Pass) No (Fail)

If no, explain _____

Malfunction Telltale symbol or abbreviation required by FMVSS No. 101.



Or

ESC

Vehicle uses this symbol

Vehicle uses this abbreviation

Other (Fail)

Note any words or additional symbols used.

Is ESC malfunction telltale part of a common space? Yes No

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

If yes, explain telltale operation during ESC activation:

ESC telltale will blink when ESC or traction control is operating.

3. TEST DATAcontinued

DATA SHEET 3 (Page 3 of 4)
ESC MALFUNCTION AND OFF TELLTALES
Location, Labeling and Bulb Check

Malfunction Telltale Lamp Function, OR Two-Part Malfunction/Off Telltale Lamp Function:

Identify position of starting system when telltale illuminates.

- | | |
|--|--|
| <input type="checkbox"/> OFF/LOCK | <input type="checkbox"/> Between OFF/LOCK and ON/RUN |
| <input checked="" type="checkbox"/> ON/RUN | <input type="checkbox"/> Between ON/RUN and Start |

Is malfunction telltale yellow in color? X Yes No (fail)

Time malfunction telltale remains illuminated: 2 seconds

Note: If malfunction telltale is part of common space, it is not required to illuminate during this check of lamp function.

Starter Interlock:

Does vehicle have any starter, transmission or other interlocks that affect operation of the telltale lamp check functions? Yes X No

If yes, describe the interlock feature:

"ESC OFF" Telltale Lamp Function (If separate from Malfunction Telltale):

Identify position of starting system when "ESC OFF" telltale illuminates.

- | | |
|--|--|
| <input type="checkbox"/> OFF/LOCK | <input type="checkbox"/> Between OFF/LOCK and ON/RUN |
| <input checked="" type="checkbox"/> ON/RUN | <input type="checkbox"/> Between ON/RUN and Start |

Is "ESC OFF" telltale yellow in color? X Yes No (fail)

Time "ESC OFF" telltale remains illuminated: 2 seconds

Note: If "ESC OFF" telltale is part of common space, it is not required to illuminate during this check of lamp function.

3. TEST DATA....continued

DATA SHEET 3 (Page 4 of 4)
ESC MALFUNCTION AND OFF TELLTALES
Location, Labeling and Bulb Check

Starter Interlock:

Does vehicle have any starter, transmission or other interlocks that affect operation of the "ESC OFF" telltale lamp check functions? Yes No

If yes, describe the interlock feature:

DATA INDICATES COMPLIANCE

PASS/FAIL Pass

Remarks:

The telltales illuminate when the ignition system is "on". This state can be achieved by pressing the start/stop button twice without depressing the brake pedal, or by pressing the start/stop button once while depressing the brake pedal.

Recorded by: Peter Broen

Date: 5/4/2012

Approved by: B Keschull

Date: 5/8/2012

3. TEST DATAcontinued

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

VEHICLE MAKE/MODEL/BODY STYLE: 2012 Infiniti QX56

VEHICLE NHTSA NO. CC5202

TEST DATE: 5/4/2012

"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?

Yes No

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

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

Description:

Identify each control location, labeling and selectable modes.

First Control: (If applicable)	Location <u>Center console, just behind the transmission select lever (see Figure 5.14)</u>
	Labeling <u>See below and Figure 5.14</u>
	Modes <u>VDC (ESC) on and off</u>

"ESC OFF" Control identification symbol or abbreviation required by FMVSS No. 101.



Or

ESC OFF

Vehicle uses this symbol

Vehicle uses this abbreviation

Note any words or additional symbols used. _____

3. TEST DATAcontinued

DATA SHEET 4 (Page 2 of 4)
ESC AND ANCILLARY SYSTEM CONTROLS

Second Control:
(If applicable)

Location NA

Labeling _____

Modes _____

“ESC OFF” Control identification symbol or abbreviation required by FMVSS No. 101.

 Or **ESC OFF**

_____ Vehicle uses this symbol

_____ Vehicle uses this abbreviation

Note any words or additional symbols used.

Identify standard or default drive configuration 2WD Default

Verify standard or default drive configuration selected. Yes No

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

NA Yes No (Fail)

Does the “ESC Off” telltale extinguish when the starting system is cycled from “On” (“Run”) to “Lock” or “Off” and then back again to the “On” (“Run”) position?

NA Yes No (Fail)

If no, describe how off control functions:

3. TEST DATAcontinued

**DATA SHEET 4 (Page 4 of 4)
ESC AND ANCILLARY SYSTEM CONTROLS**

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

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

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

Ancillary Control	"ESC Off" telltale extinguishes upon cycling starting system? (Yes/No)
<i>NA</i>	

For each ancillary control that illuminates the "ESC Off" telltale, did the telltale extinguish when the starting system 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 starting system has been cycled off and then back on and therefore the "ESC Off" telltale may not extinguish.

 X NA Yes No (fail)

DATA INDICATES COMPLIANCE:

PASS/FAIL **PASS**

Remarks:

Recorded by: *B Kobschull* Date: *5/4/2012*

Approved by: *J Lenkeit* Date: *5/16/2012*

3. TEST DATAcontinued

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

VEHICLE MAKE/MODEL/BODY STYLE: 2012 Infiniti QX56

VEHICLE NHTSA NO. CC5202 TEST DATE: 5/8/2012

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

Peak Friction Coefficient (at least 0.9) 0.911

Test track data meets requirements: Yes

If no, explain:

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

Coolant Yes Oil, Washer Fluid, Brake Fluid

Tire Pressures:

Required; Front Axle 240 kPa Rear Axle 240 kPa

Actual; LF 240 kPa RF 240 kPa

LR 240 kPa RR 240 kPa

Vehicle Dimensions: Front Track Width 171.4 cm Wheelbase 307.8 cm

Rear Track Width 171.4 cm

Vehicle Weight Ratings: GAWR Front 1640 kg GAWR Rear 1971 kg

Unloaded Vehicle Weight (UVW):

Front Axle 1337.6 kg Left Front 671.3 kg Right Front 666.3 kg

Rear Axle 1296.9 kg Left Rear 659.1 kg Right Rear 637.8 kg

Total UVW 2634.5 kg

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

Calculated baseline weight (UVW + 73kg) 2707.5 kg

Outrigger size required ("Light", "Standard" or "Heavy") Standard

Light – Baseline weight under 1,588 kg (3,500 lbs)

Standard - Baseline weight under 2772 kg (6000 lb)

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

3. TEST DATAcontinued

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

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

Front axle	<u>1347.6</u> kg	Left front	<u>676.3</u> kg	Right front	<u>671.3</u> kg
Rear axle	<u>1333.6</u> kg	Left rear	<u>672.7</u> kg	Right rear	<u>660.9</u> kg
Total UVW with outriggers				<u>2681.2</u>	kg

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

Front axle	<u>1425.2</u> kg	Left front	<u>725.3</u> kg	Right front	<u>699.9</u> kg
Rear axle	<u>1403.0</u> kg	Left rear	<u>714.9</u> kg	Right rear	<u>688.1</u> kg
Vehicle Weight				<u>2828.2</u>	kg

Ballast Required = [Total UVW with Outriggers (if applicable)]
+ 168 kg
- [Loaded Weight w/Driver and Instrumentation]
= 2681.2 + 168 - 2828.2 (kg)
= 21.0 kg

Total Loaded Vehicle Weight w/Driver and Instrumentation and Ballast

Front axle	<u>1433.3</u> kg	Left front	<u>725.7</u> kg	Right front	<u>707.6</u> kg
Rear axle	<u>1416.1</u> kg	Left rear	<u>718.9</u> kg	Right rear	<u>697.2</u> kg
Total Loaded Vehicle Weight				<u>2849.4</u>	kg

3. TEST DATAcontinued

DATA SHEET 5 (Page 3 of 3) TEST TRACK AND VEHICLE DATA

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

x-distance (longitudinal) Point of reference is the front axle centerline.
(Positive from front axle toward rear of vehicle.)

y-distance (lateral) Point of reference is the vehicle centerline.
(Positive from the center toward the right.)

z-distance (vertical) Point of reference is the ground plane.
(Positive from the ground up.)

Locations:

	<u>Center of Gravity</u>	<u>Inertial Sensing System</u>
x-distance	<u>153.0 cm (60.2 in)</u>	<u>195.3 cm (76.9 in)</u>
y-distance	<u>-1.2 cm (-0.5 in)</u>	<u>-2.2 cm (-0.9 in)</u>
z-distance	<u>72.6 cm (28.6 in)</u>	<u>70.2 cm (27.6 in)</u>

Roof Height 191.0 cm (75.2 in)

Distance between ultrasonic sensors 229.9 cm (90.5 in)

Remarks:

Recorded by: P Broen Date Recorded: 5/8/2012
Approved by: J Lenkeit Date Approved: 5/16/2012

3. TEST DATAcontinued

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

VEHICLE MAKE/MODEL/BODY STYLE: 2012 Infiniti QX56

VEHICLE NHTSA NO.: CC5202

Measured tire pressure: LF 255 kPa RF 259 kPa

LR 251 kPa RR 254 kPa

Wind Speed 0 m/s

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

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 25 °C

Brake Conditioning Time: 10:00 Date: 5/8/2012

56 km/h (35 mph) Brake Stops

Number of stops executed (10 required) 10 Stops

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

72 km/h (45 mph) Brake Stops

Number of stops executed (3 required) 3 Stops

Number of stops ABS activated (3 required) 3 Stops

Observed deceleration range 0.9-1.0 g

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

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

3. TEST DATAcontinued

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

VEHICLE MAKE/MODEL/BODY STYLE: 2012 Infiniti QX56

VEHICLE NHTSA NO.: CC5202

Test Date: 5/8/2012

Measured tire pressure: LF 268 kPa RF 271 kPa
 LR 261 kPa RR 264 kPa

Wind Speed 4.2 m/s

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

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 30 °C

Selected drive configuration: default RWD

Selected Mode: VDC (ESC) on

Preliminary Left Steer Maneuver:

Lateral Acceleration measured at 30 degrees steering wheel angle

$$a_{y,30degrees} = \underline{0.27} \text{ g}$$

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

$$\frac{30 \text{ degrees}}{a_{y,30degrees}} = \frac{\delta_{SIS}}{0.55 \text{ g}} \qquad \delta_{SIS} = \underline{61.1} \text{ degrees (@.55g)}$$

$$\delta_{SIS} = \underline{60} \text{ degrees (rounded)}$$

Steering Wheel Angle at Corrected 0.3g Lateral Acceleration:

Maneuver	Initial Steer Direction	Time Clock (5 min max between runs)	Steering Wheel Angle to nearest 0.1° (degrees)	Data Run	Good/NG
1	Left	<u>10:49</u>	<u>36.4</u>	<u>10</u>	<u>Good</u>
2	Left	<u>10:54</u>	<u>37.2</u>	<u>11</u>	<u>Good</u>
3	Left	<u>10:59</u>	<u>37.5</u>	<u>12</u>	<u>Good</u>
4	Left				
5	Left				
1	Right	<u>11:02</u>	<u>36.3</u>	<u>13</u>	<u>Good</u>
2	Right	<u>11:07</u>	<u>36.3</u>	<u>14</u>	<u>Good</u>
3	Right	<u>11:09</u>	<u>36.7</u>	<u>15</u>	<u>Good</u>
4	Right				
5	Right				

3. TEST DATAcontinued

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

Average Overall Steering Wheel Angle:

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

$$\delta_{0.3\text{ g, overall}} = \underline{\underline{36.7}} \text{ degrees}$$

[to nearest 0.1 degree]

Remarks:

Recorded by::	<u>P Broen</u>	Date recorded::	<u>5/8/2012</u>
Approved by::	<u>J Lenkeit</u>	Date approved::	<u>5/16/2012</u>

3. TEST DATA....continued

Data Sheet 8 (Page 1 of 3)

VEHICLE LATERAL STABILITY AND RESPONSIVENESS

Vehicle: 2012 Infiniti QX56

NHTSA No. CC5202

Data sheet completion date: 5/8/2012

Tire conditioning completed Yes No

ESC system is enabled Yes No

On track calibration checks have been completed Yes No

On track static data file for each sensor obtained Yes No

Selected Drive Configuration: default: RWD

Selected Mode: VDC (ESC) on

Overall steering wheel angle ($\delta_{0.3\text{ g, overall}}$) 36.7 degrees

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

Maneuver #	Clock Time (1.5 – 5.0 min max between runs)	Commanded Steering Wheel Angle ¹		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [$< 35\%$]		YRR at 1.75 sec after COS [$< 20\%$]	
		Scalar (* $\delta_{0.3\text{ g}}$)	Angle (degrees)	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0\text{sec}}$	$\dot{\psi}_{1.75\text{sec}}$	%	Pass/Fail	%	Pass/Fail
21	11:49	1.5	55	13.45	-0.20	0.06	-1.52	PASS	0.47	PASS
22	11:54	2.0	73	17.91	-0.33	-0.18	-1.82	PASS	-1.01	PASS
23	11:57	2.5	92	23.12	-0.18	-0.15	-0.79	PASS	-0.65	PASS
24	12:00	3.0	110	27.50	-0.35	-0.36	-1.29	PASS	-1.30	PASS
25	12:03	3.5	129	22.64	-0.08	-0.10	-0.34	PASS	-0.43	PASS
26	12:06	4.0	147	25.58	-0.13	-0.15	-0.53	PASS	-0.59	PASS
27	12:10	4.5	165	31.66	-0.06	-0.12	-0.18	PASS	-0.36	PASS
28	12:13	5.0	184	34.19	-0.04	-0.11	-0.10	PASS	-0.31	PASS
29	12:16	5.5	202	32.86	-0.06	-0.14	-0.18	PASS	-0.43	PASS
30	12:19	6.0	220	37.87	0.00	-0.07	0.00	PASS	-0.19	PASS
31	12:22	6.5	239	39.03	-0.08	-0.11	-0.19	PASS	-0.29	PASS
32	12:25	7.0	257	37.87	-0.11	-0.01	-0.28	PASS	-0.04	PASS
33	12:28	7.5	270	40.10	0.00	0.07	0.00	PASS	0.19	PASS

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

3. TEST DATAcontinued

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

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

Maneuver #	Clock Time (1.5 – 5.0 min max between runs)	Commanded Steering Wheel Angle ¹		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [$< 35\%$]		YRR at 1.75 sec after COS [$< 20\%$]	
		Scalar (* $\delta_{0.3g}$)	Angle (degrees)	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/Fail	%	Pass/Fail
34	12:31	1.5	55	-13.35	0.29	0.11	-2.15	PASS	-0.80	PASS
35	12:35	2.0	73	-18.43	0.08	0.00	-0.42	PASS	0.02	PASS
36	12:38	2.5	92	-23.28	-0.03	-0.04	0.15	PASS	0.17	PASS
37	12:41	3.0	110	-29.04	0.12	-0.11	-0.42	PASS	0.39	PASS
38	12:44	3.5	129	-22.62	-0.16	-0.12	0.72	PASS	0.51	PASS
39	12:47	4.0	147	-25.44	-0.12	-0.14	0.46	PASS	0.53	PASS
40	12:51	4.5	165	-28.41	-0.36	-0.23	1.26	PASS	0.81	PASS
41	12:54	5.0	184	-31.52	-0.02	-0.03	0.08	PASS	0.08	PASS
42	12:57	5.5	202	-32.40	-0.10	-0.03	0.32	PASS	0.10	PASS
43	13:00	6.0	220	-33.68	-0.03	-0.06	0.09	PASS	0.17	PASS
44	13:03	6.5	239	-38.07	-0.16	-0.20	0.41	PASS	0.51	PASS
45	13:06	7.0	257	-41.08	0.12	0.05	-0.30	PASS	-0.13	PASS
46	13:09	7.5	270	-40.34	0.05	0.04	-0.12	PASS	-0.10	PASS

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

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

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

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

3. 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 ($5.0 * \delta_{0.3g, overall}$ or greater)		Calculated Lateral Displacement ¹	
		Scalar $* \delta_{0.3g}$	Angle (degrees)	Distance (m)	Pass/Fail
28	Counter Clockwise	5.0	184	-2.71	PASS
29	Counter Clockwise	5.5	202	-2.66	PASS
30	Counter Clockwise	6.0	220	-2.74	PASS
31	Counter Clockwise	6.5	239	-2.79	PASS
32	Counter Clockwise	7.0	257	-2.75	PASS
33	Counter Clockwise	7.5	270	-2.72	PASS
41	Clockwise	5.0	184	2.55	PASS
42	Clockwise	5.5	202	2.53	PASS
43	Clockwise	6.0	220	2.56	PASS
44	Clockwise	6.5	239	2.58	PASS
45	Clockwise	7.0	257	2.61	PASS
46	Clockwise	7.5	270	2.58	PASS

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

DATA INDICATES COMPLIANCE:

PASS FAIL

Remarks:

Recorded by:: P Broen Date recorded:: 5/8/2012
 Approved by:: B Keschull Date approved:: 5/8/2012

3. TEST DATAcontinued

DATA SHEET 9 (Page 1 of 6)
MALFUNCTION WARNING TESTS

TEST 1

Vehicle: 2012 Infiniti QX56

NHTSA No. CC5202

Data Sheet Completion Date: 5/8/2012

METHOD OF MALFUNCTION SIMULATION: Describe method of malfunction simulation

Disconnect Steering Wheel Angle Sensor

MALFUNCTION TELLTALE ILLUMINATION:

Telltale illuminates and remains illuminated after starting system is activated and if necessary the vehicle is driven at least 2 minutes as specified

Yes No (Fail)

Telltale illuminated when engine was started, no driving required.

Yes (Pass) No

Driving was required to illuminate telltale.

Yes No

When driving was required telltale illuminated before vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was reached.

NA Yes (Pass) No

If driving required, approximate driving time below vehicle speed of 48 ± 8 km/h (30 ± 5 mph) to activate telltale.

Seconds

Driving above a vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was required to illuminate telltale.

NA Yes No

If driving required, time for telltale to illuminate after starting system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

Seconds (must be within 2 minutes) Pass Fail

3. TEST DATAcontinued

DATA SHEET 9 (Page 2 of 6)
MALFUNCTION WARNING TESTS

TEST 1

Identify all other telltales and/or warning messages activated upon simulating subject ESC system malfunction.

ESC malfunction symbol, IBA OFF, Lane departure warning symbol, AFS OFF, warning triangle (exclamation mark inside triangle)

Did the malfunction telltale re-illuminate after the starting system was shut off for five minutes and then turned back on with the engine running?

Yes (Pass) No (Fail)

ESC SYSTEM RESTORATION:

Describe method used to restore system to normal operation:

Reconnect the Steering Wheel Angle Sensor

After system restoration is completed, telltale extinguishes after vehicle starting system is activated and if necessary the vehicle is driven at least 2 minutes as specified.

Yes No (Fail)

Telltale extinguished when engine was started, no driving required.

Yes (Pass) No

Driving was required to extinguish telltale.

Yes No

When driving was required telltale extinguished before vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was reached.

NA Yes (Pass) No

If driving required, approximate driving time below vehicle speed of 48 ± 8 km/h (30 ± 5 mph) to extinguish telltale.

_____ Seconds

3. TEST DATAcontinued

DATA SHEET 9 (Page 4 of 6)
MALFUNCTION WARNING TESTS

TEST 2

Vehicle: 2012 Infiniti QX56

NHTSA No. CC5202

Data Sheet Completion Date: 5/8/2012

MALFUNCTION SIMULATION: Describe method of malfunction simulation

Disconnect left front wheel speed sensor

MALFUNCTION TELLTALE ILLUMINATION:

Telltale illuminates and remains illuminated after starting system is activated and if necessary the vehicle is driven at least 2 minutes as specified.

Yes No (Fail)

Telltale illuminated when engine was started, no driving required.

Yes (Pass) No

Driving was required to illuminate telltale.

Yes No

When driving was required telltale illuminated before vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was reached.

NA Yes (Pass) No

If driving required, approximate driving time below vehicle speed of 48 ± 8 km/h (30 ± 5 mph) to activate telltale.

_____ Seconds

Driving above a vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was required to illuminate telltale.

NA Yes No

If driving required, time for telltale to illuminate after starting system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

Seconds (must be within 2 minutes) _____ Pass _____ Fail

3. TEST DATAcontinued

DATA SHEET 9 (Page 5 of 6)
MALFUNCTION WARNING TESTS

TEST 2

Identify all other telltales and/or warning messages activated upon simulating subject ESC system malfunction.

The ESC and ABS malfunction symbols illuminate immediately. After about one minute the IBA OFF and Lane Departure Warning symbols also illuminate.

Did the malfunction telltale re-illuminate after the starting system was shut off for five minutes and then turned back on with the engine running?

Yes (Pass) No (Fail)

ESC SYSTEM RESTORATION:

Describe method used to restore system to normal operation:

Reconnected the left front wheel speed sensor.

After system restoration is completed, telltale extinguishes after vehicle starting system is activated and if necessary the vehicle is driven at least 2 minutes as specified.

Yes No (Fail)

Telltale extinguished when engine was started, no driving required.

Yes (Pass) No

Driving was required to extinguish telltale.

Yes No

When driving was required telltale extinguished before vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was reached.

NA Yes (Pass) No

If driving required, approximate driving time below vehicle speed of 48 ± 8 km/h (30 ± 5 mph) to extinguish telltale.

_____ Seconds

3. TEST DATAcontinued

DATA SHEET 9 (Page 6 of 6)
MALFUNCTION WARNING TESTS

TEST 2

Driving above a vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was required to extinguish telltale.

NA Yes No

If driving required, time for telltale to extinguish after starting system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

_____ Seconds (must be within 2 minutes) _____ Pass _____ Fail

DATA INDICATES COMPLIANCE: PASS/FAIL **Pass**

Remarks:

Recorded by: P Broen

Date recorded: 5/8/2012

Approved by: B Kebschull

Date approved: 5/8/2012

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

TABLE 1. TEST INSTRUMENTATION

Type	Output	Range	Resolution	Accuracy	Specifics	Serial Number	Calibration
Tire Pressure Gauge	Vehicle Tire Pressure	0-100 psi 0-690 kPa	1 psi 6.89 kPa	0.5 psi 3.45 kPa	Ashcroft D1005PS	1039350	By: DRI Date: 2/15/12 Due: 2/15/13
Platform Scales	Vehicle Total, Wheel, and Axle Load	8000 lb 35.6 kN	0.5 lb 2.2 N	± 1.0% of applied load	Intercomp Model SWII	24032361	By: DRI Date: 3/7/12 Due: 3/7/13
Automated Steering Machine with Steering Angle Encoder	Handwheel Angle	± 800 deg	0.25 deg	± 0.25 deg	Heitz Automotive Testing Model: Sprint 3	60304	By: DRI Date: 3/30/12 Due: 3/30/13
Multi-Axis Inertial Sensing System	Longitudinal, Lateral, and Vertical Acceleration Roll, Yaw, and Pitch Rate	Accelerometers: ± 2 g Angular Rate Sensors: ± 100 deg/s	Accelerometers: ≤10 ug Angular Rate Sensors: ≤0.004 deg/s	Accelerometers: ≤0.05% of full range Angular Rate Sensors: 0.05% of full range	BEI Technologies Model: MotionPAK MP-1	0767	By: Systron Donner Date: 2/27/12 Due: 2/27/13
Radar Speed Sensor and Dashboard Display	Vehicle Speed	0-125 mph 0-200 km/h	0.009 mph .014 km/h	± 0.25% of full scale	A-DAT Corp. Radar Model: DRS-6 Display Model: RD-2	1400.604	By: DRI Date: 5/7/12 Due: 5/7/13
Ultrasonic Distance Measuring System	Left and Right Side Vehicle Height	5-24 inches 127-610 mm	0.01 inches .254 mm	± 0.25% of maximum distance	Massa Products Corporation Model: M-5000/220	DOT-NHTSA D2646	By: DRI Date: 1/18/12 Due: 1/18/13
						DOT-NHTSA D3272	By: DRI Date: 1/20/12 Due: 1/20/13

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

TABLE 1. TEST INSTRUMENTATION (CONTD)

Type	Output	Range	Resolution	Accuracy	Specifics	Serial Number	Calibration
Data Acquisition System [Includes amplification, anti-aliasing, and analog to digital conversion.]	Record Time; Velocity; Distance; Lateral, Longitudinal, and Vertical Accelerations; Roll, Yaw, and Pitch Rates; Steering Wheel Angle.	Sufficient to meet or exceed individual sensors	200 Hz	Sufficient to meet or exceed individual sensors	SoMat eDaq ECPU processor	MSHLB.03-2476	By: DRI Date: 4/9/12 Due: 4/9/13
					SoMat High level Board EHLS	MSHLS.03-3182	
Load Cell	Vehicle Brake Pedal Force	0-300 lb 0-1.33 kN	1 lb 4.44 N	±0.05% of full scale	Lebow 3663-300	767	Verified by DRI on date of test
Coordinate Measurement Machine	Inertial Sensing System Coordinates	0-8 ft 0-2.4 m	±.0020 in. ±.051 mm	±.0020 in. ±.051 mm (Single point articulation accuracy)	Faro Arm Fusion	UO8-05-08-06636	By: DRI Date: 11/2/11 Due: 11/2/12
Outriggers	No output. Safety Item.	N/A	N/A	N/A	DRI manufactured Aluminum meeting the weight and MOI specifications of Docket 2007-27662-11	N/A	N/A

5.0 PHOTOGRAPHS (1 of 14)



Figure 5.1. Front View of Test Vehicle

5.0 PHOTOGRAPHS (2 of 14)



2012 Infiniti QX56
FMVSS No. 126
NHTSA Number CC5202
May 2012

Figure 5.2. Rear View of Test Vehicle

5.0 PHOTOGRAPHS (3 of 14)

MFD BY NISSAN MOTOR CO., LTD.

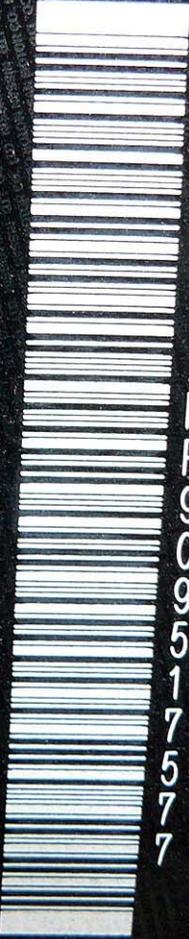
DATE: 2/12
GVWR/PNBV: 7300 LB
GAWR/PNBE FR: 3615 LB
WITH P275/50R22 TIRES
22X8J RIMS. AT 35PSI
COLD SINGLE.
GAWR/PNBE RR: 4345 LB
WITH P275/50R22 TIRES
22X8J RIMS. AT 35PSI
COLD SINGLE.

THIS VEHICLE CONFORMS TO
ALL APPLICABLE FEDERAL
MOTOR VEHICLE SAFETY
STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE
SHOWN ABOVE.

VIN: JN8AZ2NF9C9517577
TYPE: MPV

COLOR	TRIM	TRANS
QAA	G	RE7R0TB
AXLE	ENGINE	
RD29	VK56(VD)	5552CC

JN8AZ2NF9C9517577



2012 Infiniti QX56
FMVSS No. 126
NHTSA Number CC5202
May 2012

Figure 5.3. Vehicle Certification Label

5.0 PHOTOGRAPHS (4 of 14)

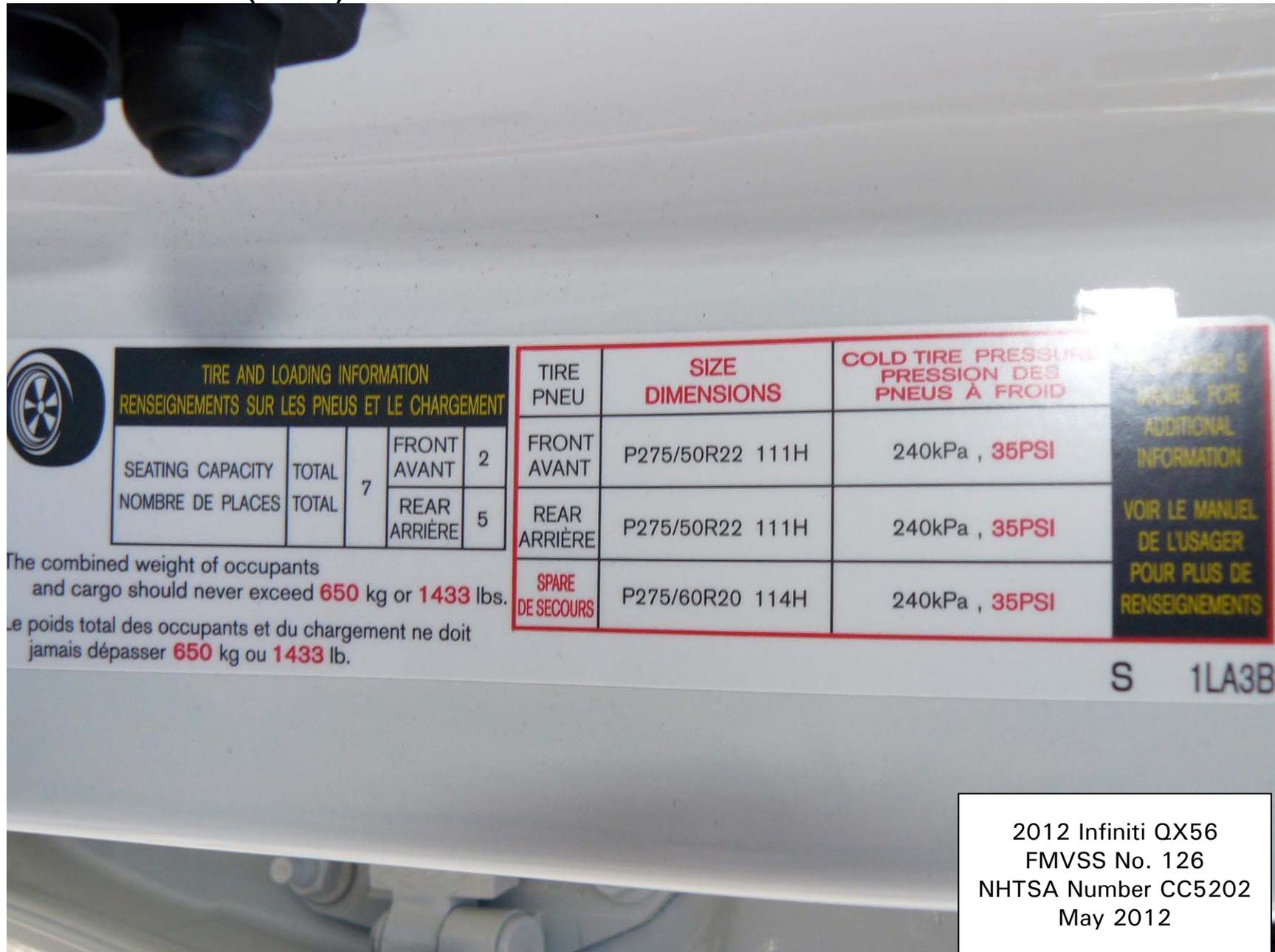


Figure 5.4. Vehicle Placard

5.0 PHOTOGRAPHS (5 of 14)



2012 QX56 2WD

Standard Equipment Included at No Extra Charge

PERFORMANCE:
5.6-liter V8 engine with VVEL and DIG™
400 horsepower
413 lb-ft torque
Rear-wheel drive with Snow Mode, Tow Mode, and Hill start assist
7-speed automatic transmission with Adaptive Shift Control (ASC) and manual shift mode with Downshift Rev Matching
20-inch, 7-spoke aluminum-alloy wheels
275/60R20 all-season tires
Rear automatic self-leveling suspension
Integrated Class IV tow hitch and 7-pin wiring harness with cover

LUXURY:
Leather-appointed seats
Tuscan Burl trim
Heated 10-way power driver's seat including 2-way power lumbar support
Heated 8-way power passenger front seat including 2-way power lumbar support
Including 2-way power lumbar support
Heated leather-wrapped steering wheel
Power tilt/telescopic steering column
Infiniti signature analog clock
Tri-Zone Automatic Temperature Control System with microfilter
Power 60/40-split folding and reclining third row seats
Sequential welcome lighting illuminated entry system and overhead ambient light
Auto-dimming inside mirror with Homelink® Universal Transceiver
Power rear liftgate
Automatic on/off High Intensity Discharge (HID) bi-functional xenon headlights
Fog lights
Rain-sensing, variable intermittent front windshield wipers
Power folding, heated outside mirrors with integrated turn signals, courtesy lights and reverse tilt-down feature

TECHNOLOGY:
Infiniti Hard Drive Navigation System
Infiniti Voice Recognition
XM® Satellite Radio****, XM NavTraffic®, XM NavWeather™ and Zagat Survey® Restaurant Guide
Around View® Monitor with Front and Rear Sonar System
Infiniti Intelligent Key with Illuminated Push Button Ignition
Bluetooth® Hands-free Phone System
Streaming Audio via Bluetooth® wireless technology
Bose® 13-speaker Premium Sound System, including two subwoofers, AM/FM radio, single in-dash CD/DVD player with MP3 playback capability, Radio Data System (RDS) and speed-sensitive volume control
USB connection port for iPod® interface and other compatible devices

SAFETY AND SECURITY:
Infiniti Advanced Air Bag System (AABS)
Driver and front passenger seat-mounted side-impact supplemental air bags
Roof-mounted curtain side-impact supplemental air bags for all three rows with rollover sensor
3-point Automatic Locking Retractor (ALR) and Emergency Locking Retractor (ELR) seat belts (driver ELR only)
Front seat belts with pretensioners, and load limiters
Front-seat Active Head Restraints
Lower Anchors and Tethers for Children (LATCH) for 2nd row outboard positions
Child safety rear door locks
4-wheel Anti-lock Braking System (ABS) Brake Assist
Electronic Brake force Distribution (EBD)
Vehicle Dynamic Control (VDC) with Traction Control System (TCS)
Tire Pressure Monitoring System (TPMS) with Tire Inflation Indicator
Vehicle Security System (VSS)
Infiniti Vehicle Immobilizer System

**** Optional equipment replaces standard equipment

EPA Fuel Economy Estimates

CITY MPG 14	Estimated Annual Fuel Cost \$3,703 <small>based on 15,000 miles at \$3.95 per gallon</small>	HIGHWAY MPG 20
Expected range for most drivers 11 to 17 MPG		
Combined Fuel Economy This Vehicle 16 All SUVs		

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

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver	Not Rated
	Passenger	Not Rated
<small>Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.</small>		
Side Crash	Front seat	Not Rated
	Rear seat	Not Rated
<small>Based on the risk of injury in a side impact.</small>		
Rollover		Not Rated
<small>Based on the risk of rollover in a single-vehicle crash.</small>		

Star ratings range 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.

TOTAL OWNERSHIP EXPERIENCE®

Every Infiniti Vehicle includes Infiniti's:

- 4-Year/60,000 Mile Basic Limited Warranty Coverage**
- 6-Year/70,000 Mile Powertrain Limited Warranty Coverage**
- 7-Year/Unlimited Mileage Corrosion Limited Warranty Coverage**
- 24-Hour Roadside Assistance***
- Complimentary Service Loan Car***
- Infiniti Personal Assistant***

** Please see the Infiniti Warranty Information booklet for details.
*** Please ask your Infiniti retailer for details.

DELIVERY

VEHICLE COLORS:
EXT: MOONLIGHT WHITE
INT: GRAPHITE

FINAL ASSEMBLY POINT:
LOS ANGELES

TRANSPORT METHOD:
TRUCK

DEALER:
CERRITOS INFINITI
11011 SOUTH ST
CERRITOS CA
90 03

VIN: JN8AZ2NF9C9517577
EMS: 50 STATE EMISSIONS
MDL: 83112-517577 QAA-G
OPT: C-C03H01H02K01L92
N92S5W01266

20120316160853R171107

2012 Infiniti QX56
FMVSS No. 126
NHTSA Number CC5202
May 2012

Figure 5.5. Window Sticker (Monroney Label)

5.0 PHOTOGRAPHS (6 of 14)



2012 Infiniti QX56
FMVSS No. 126
NHTSA Number CC5202
May 2012

Figure 5.6. Front View of Vehicle As-Tested

5.0 PHOTOGRAPHS (7 of 14)



2012 Infiniti QX56
FMVSS No. 126
NHTSA Number CC5202
May 2012

Figure 5.7. Rear View of Vehicle As-Tested

5.0 PHOTOGRAPHS (8 of 14)



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

5.0 PHOTOGRAPHS (9 of 14)



Figure 5.9. Rear Mounted Speed Sensor

5.0 PHOTOGRAPHS (10 of 14)



2012 Infiniti QX56
FMVSS No. 126
NHTSA Number CC5202
May 2012

Figure 5.10. Steering Controller and Data Acquisition Computer

5.0 PHOTOGRAPHS (11 of 14)

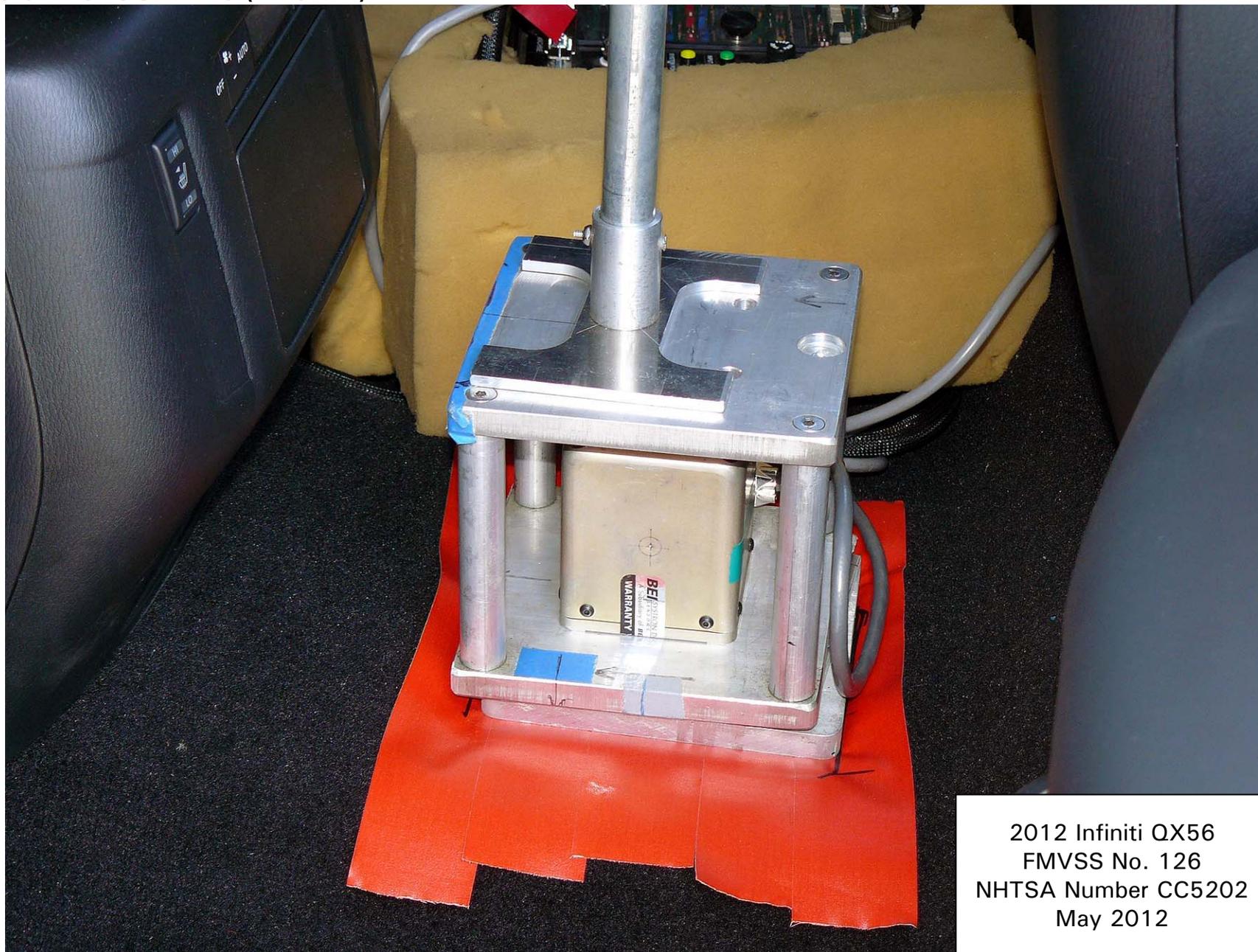


Figure 5.11. Inertial Measurement Unit Mounted in Vehicle

5.0 PHOTOGRAPHS (12 of 14)



Figure 5.12. Brake Pedal Load Cell

5.0 PHOTOGRAPHS (13 of 14)



Figure 5.13. Telltale for ESC Off and ESC Malfunction

5.0 PHOTOGRAPHS (14 of 14)



2012 Infiniti QX56
FMVSS No. 126
NHTSA Number CC5202
May 2012

Figure 5.14. ESC Off Control Switch

6.0 DATA PLOTS (1 of 4)

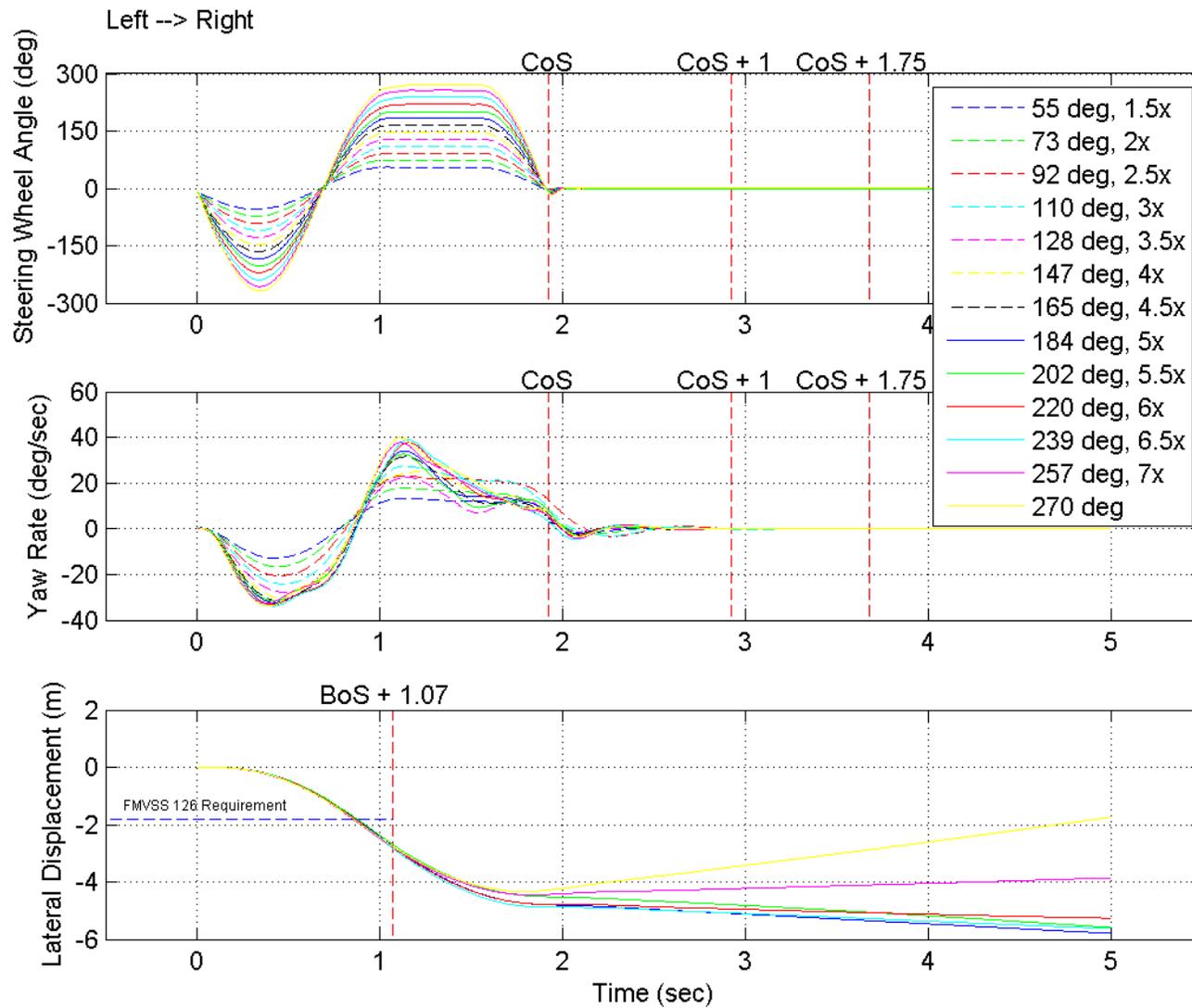


Figure 6.1. Steering Wheel Angle, Yaw Rate and Lateral Displacement for L-R Series

6.0 DATA PLOTS (2 of 4)

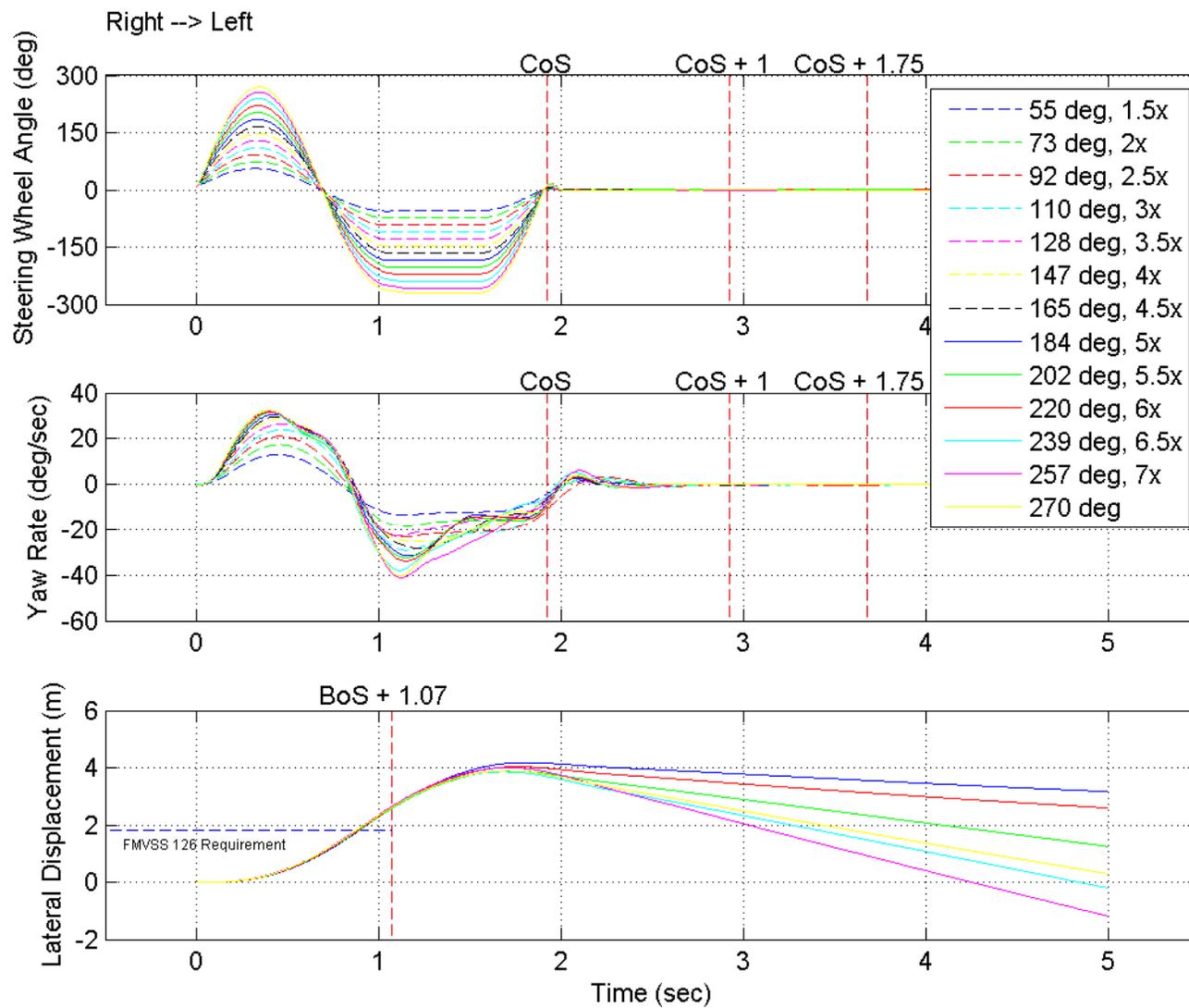


Figure 6.2. Steering Wheel Angle, Yaw Rate and Lateral Displacement for R-L Series

6.0 DATA PLOTS (3 of 4)

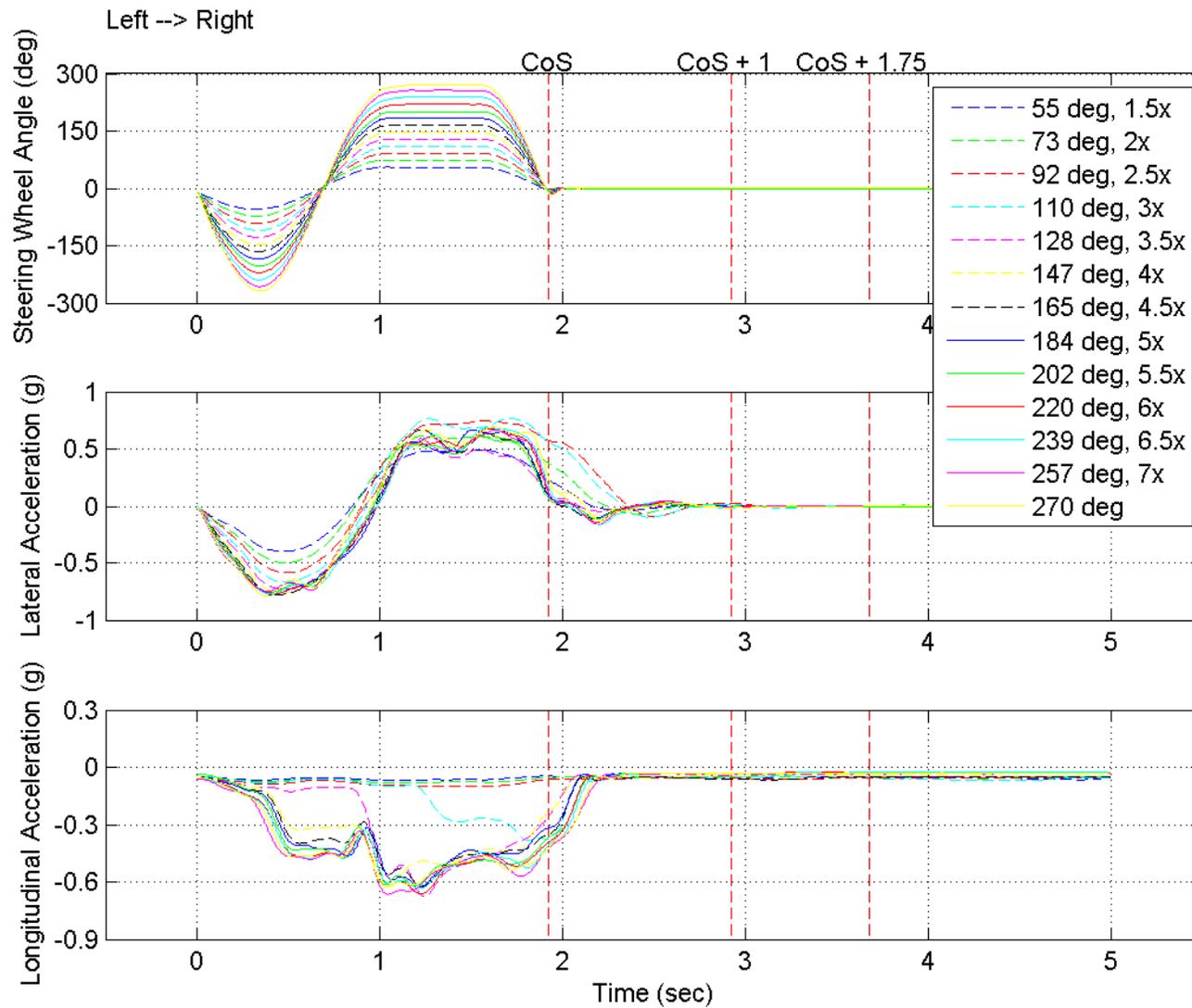


Figure 6.3. Steering Wheel Angle, Lateral Acceleration and Longitudinal Acceleration for L-R Series

6.0 DATA PLOTS (4 of 4)

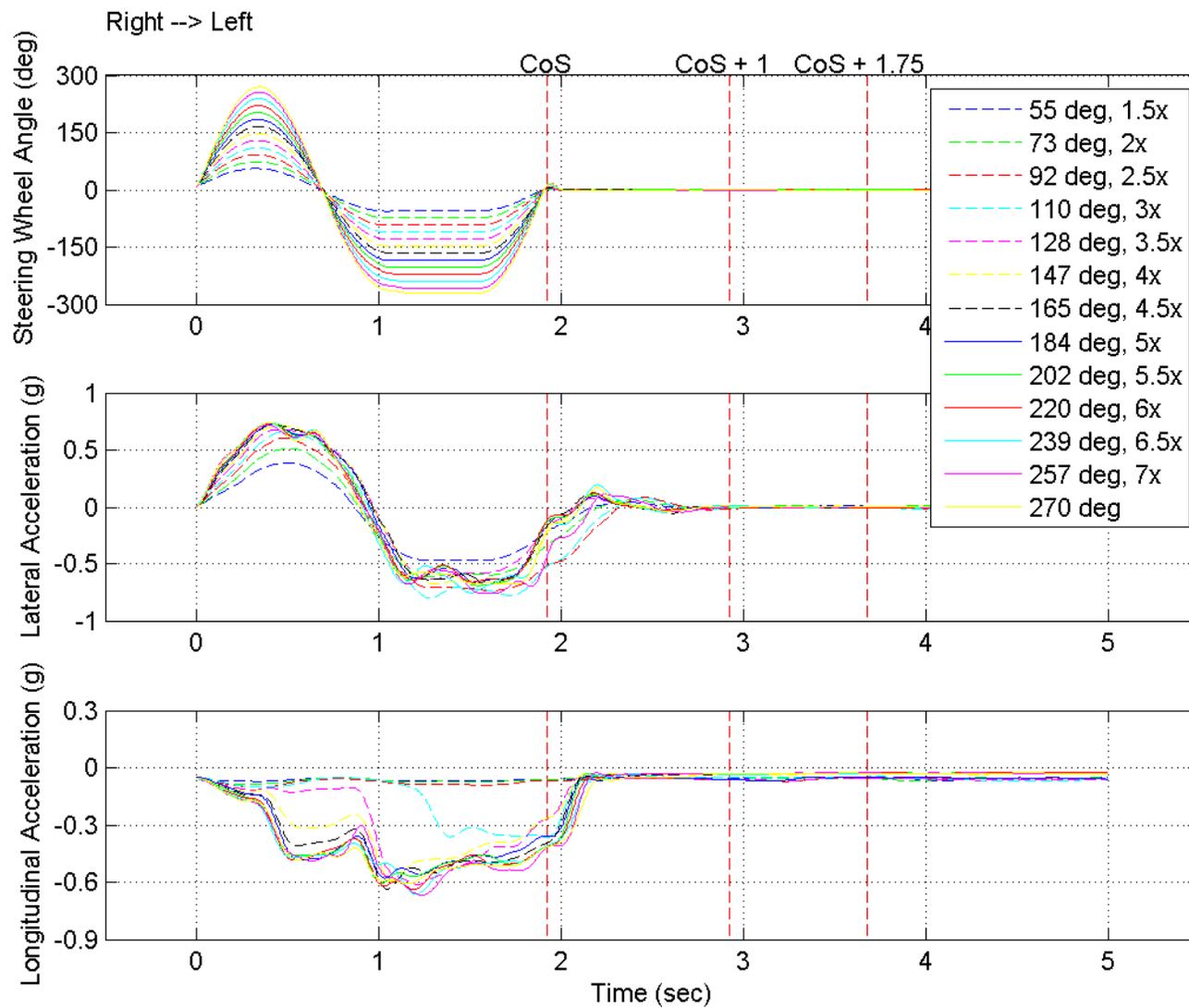


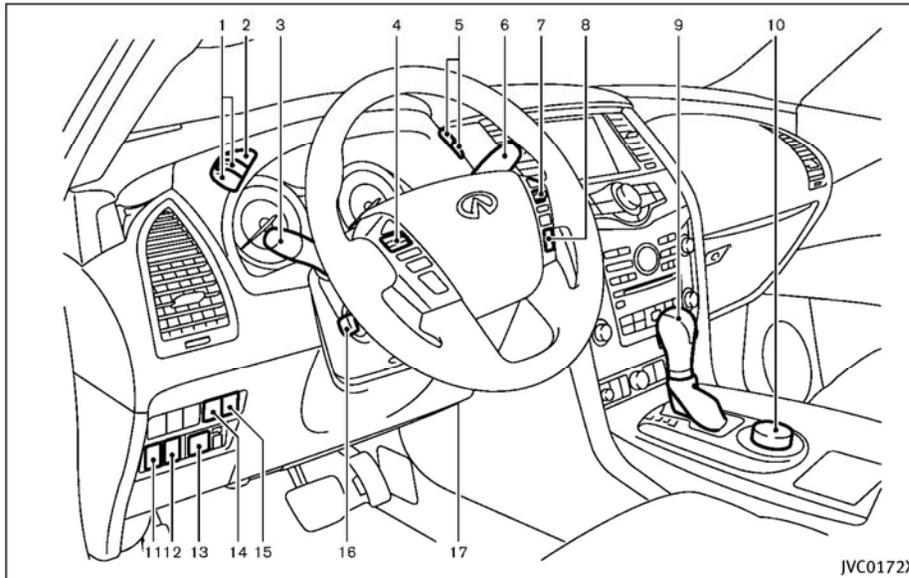
Figure 6.4. Steering Wheel Angle, Lateral Acceleration and Longitudinal Acceleration for R-L Series

7.0 OTHER DOCUMENTATION

- 7.1 OWNER'S MANUAL PAGES
- 7.2 VEHICLE ARRIVAL CONDITION REPORT
- 7.3 VEHICLE COMPLETION CONDITION REPORT
- 7.4 SINE WITH DWELL TEST RESULTS
- 7.5 SLOWLY INCREASING STEER TEST RESULTS
- 7.6 INERTIAL SENSING SYSTEM LOCATION COORDINATES

7.1 OWNER'S MANUAL PAGES

COCKPIT



1. Instrument brightness control switch (P.2-42)
2. TRIP/RESET switch for twin trip odometer (P.2-7)
3. Headlight, fog light and turn signal switch

- Headlight (P.2-38)
 - Turn signal (P.2-43)
 - Fog light (P.2-43)
4. Steering-wheel-mounted controls (left side)

- Audio control steering switch (P.4-79)
 - Hands-Free Phone System switch (P.4-94)
5. Trip computer switch (P.2-28)
 6. Wiper and washer switch (P.2-33)
 7. Steering-wheel-mounted controls (right side)
 - Cruise control system* (P.5-45)
 - Intelligent Cruise Control (ICC) system* (P.5-47)
 8. Dynamic driver assistance switch*
 - Lane Departure Prevention (LDP) system* (P.5-21)
 - Distance Control Assist (DCA) system* (P.5-70)
 - Blind Spot Intervention system* (P.5-31)
 9. Selector lever (P.9-29)
 10. Four-Wheel Drive (4WD) shift switch* (P.5-91)/SNOW mode switch (P.2-49)/TOW MODE switch (P.2-49)/Vehicle Dynamic Control (VDC) OFF switch (P.5-106)
 11. Headlight aiming control* (P.2-40)
 12. Power lift gate main switch (P.3-18)
 13. Outside rearview mirror remote control switch (P.3-28)

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7.1 OWNER'S MANUAL PAGES

WARNING AND INDICATOR LIGHTS

Warning light	Name	Page
	Anti-lock Braking System (ABS) warning light	2-12
	Automatic Transmission (AT) check warning light	2-12
	Automatic Transmission (AT) oil temperature warning light	2-12
	Automatic Transmission (AT) park warning light	2-12
	Brake warning light	2-13
	Blind Spot Warning (BSW)/Blind Spot Intervention (BSI) system warning light (orange)*	2-13
	Charge warning light	2-14
	Distance Control Assist (DCA) system warning light (orange)*	2-14
	Engine oil pressure warning light	2-14
	Four-Wheel Drive (4WD) warning light (4WD models)	2-14
	Intelligent Cruise Control (ICC) system warning light (orange)*	2-15
	Intelligent Key warning light	2-15
	Lane departure warning light (orange)*	2-15

Warning light	Name	Page
	Low tire pressure warning light	2-15
	Master warning light	2-17
	Preview Function warning light (orange)*	2-17
	Seat belt warning light	2-17
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Indicator light	Name	Page
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	Automatic Transmission (AT) position indicator light	2-19
	Blind Spot Intervention (BSI) ON indicator light (green)*	2-19
	Check suspension indicator light	2-19
	Cruise indicator light*	2-19
	Exterior light indicator	2-19
	Front passenger air bag status light	2-19
	High beam indicator light	2-19

Indicator light	Name	Page
	Intelligent Brake Assist (IBA) off indicator light*	2-19
	Lane Departure Prevention (LDP) ON indicator light (green)*	2-20
	Malfunction Indicator Light (MIL)	2-20
	Security indicator light	2-21
	SNOW mode indicator light	2-21
	TOW mode indicator light	2-21
	Turn signal/hazard indicator lights	2-21
	Vehicle Dynamic Control (VDC) off indicator light	2-21

*: if so equipped

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7.1 OWNER'S MANUAL PAGES

WARNING/INDICATOR LIGHTS AND AUDIBLE REMINDERS

	Anti-lock Braking System (ABS) warning light		Intelligent Key warning light		Exterior light indicator
			Lane departure warning light (orange)*		Front passenger air bag status light
	Automatic transmission check warning light		Low tire pressure warning light		High beam indicator light
	Automatic Transmission (AT) oil temperature warning light		Master warning light		Intelligent Brake Assist (IBA) off indicator light*
	Automatic Transmission (AT) park warning light		Preview Function warning light (orange)*		Lane Departure Prevention (LDP) ON indicator light (green)*
	Brake warning light		Seat belt warning light		Malfunction Indicator Light (MIL)
	Blind Spot Warning (BSW)/Blind Spot Intervention (BSI) system warning light (orange)*		Supplemental air bag warning light		Security indicator light
			Vehicle Dynamic Control (VDC) warning light		SNOW mode indicator light
	Charge warning light		Adaptive Front lighting System (AFS) indicator light*		TOW mode indicator light
	Distance Control Assist (DCA) system warning light (orange)*		Automatic transmission position indicator light		Turn signal/hazard indicator lights
	Engine oil pressure warning light		Blind Spot Intervention (BSI) ON indicator light (green)*		Vehicle Dynamic Control (VDC) off indicator light
	Four-Wheel Drive (4WD) warning light (4WD models)		Check suspension indicator light		
	Intelligent Cruise Control (ICC) system warning light (orange)*		CRUISE indicator light*		

*: if so equipped

7.1 OWNER'S MANUAL PAGES

side air bag, curtain and rollover air bag systems and/or pretensioner seat belts are operational.

If any of the following conditions occur, the front air bag, side air bag, curtain and rollover air bag and pretensioner systems needs servicing and your vehicle must be taken to your nearest INFINITI retailer.

- The supplemental air bag warning light remains on after approximately 7 seconds.
- The supplemental air bag warning light flashes intermittently.
- The supplemental air bag warning light does not come on at all.

Unless checked and repaired, the supplemental restraint system (air bag system) and/or the pretensioners may not function properly.

For additional information, see “Supplemental restraint system” in the “1. Safety – seats, seat belts and supplemental restraint system” section.



WARNING

If the supplemental air bag warning light is on, it could mean that the front air bag, side

air bag, curtain and rollover air bag systems and/or pretensioner systems will not operate in an accident. To help avoid injury to yourself or others, have your vehicle checked by a retailer as soon as possible.



Vehicle Dynamic Control (VDC) warning light

The light will blink when the VDC system or the traction control system is operating, thus alerting the driver that the vehicle is nearing its traction limits. The road surface may be slippery.

When the vehicle dynamic control warning light illuminates when the vehicle dynamic control system is turned on, this light alerts the driver to the fact that the vehicle dynamic control system's fail-safe mode is operating, for example the vehicle dynamic control or hill start assist system may not be functioning properly. Have the system checked by an INFINITI retailer. If a malfunction occurs in the system, the vehicle dynamic control system function will be canceled but the vehicle is still driveable. For additional information, see “Vehicle Dynamic Control (VDC) system” in the “5. Starting and driving” section of this

manual.

INDICATOR LIGHTS



Adaptive Front lighting System (AFS) indicator light (if so equipped)

When the ignition switch is pushed to the ON position, the Adaptive Front lighting System (AFS) indicator light will illuminate. The light will turn off in about 1 second if the AFS is operational.

If the AFS indicator light blinks, it may indicate the AFS is not functioning properly. Have the system checked by an INFINITI retailer.

See “Adaptive Front lighting System (AFS)” later in this section.



Automatic transmission position indicator light

When the ignition switch is pushed to the ON position, the indicator shows the automatic selector position.

In the manual shift mode, when the transmission does not shift to the selected gear due to a transmission protection mode, the AT position indicator light will blink and a chime will sound.

7.1 OWNER'S MANUAL PAGES

- 2) Avoid hard acceleration or deceleration.
- 3) Avoid steep uphill grades.
- 4) If possible, reduce the amount of cargo being hauled or towed.

The malfunction indicator light may stop blinking and remain on.

Have the vehicle inspected by an INFINITI retailer. You do not need to have your vehicle towed to the retailer.

CAUTION

Continued vehicle operation without having the emission control system checked and repaired as necessary could lead to poor driveability, reduced fuel economy, and possible damage to the emission control system.

Security indicator light

The light blinks when the ignition switch is in the ACC, OFF and LOCK position. This function indicates the security system equipped on the vehicle is operational.

If the security system is malfunctioning, this light will remain on while the ignition

switch is in the ON position. For additional information, see “Security systems” later in this section.

SNOW mode indicator light

When selecting SNOW mode while the engine is running, this light will illuminate. (See “SNOW mode” in the “5. Starting and driving” section.)

TOW mode indicator light

This light will illuminate when the TOW MODE is selected while the engine is running. (See “Tow mode” in the “5. Starting and driving” section.)

Turn signal/hazard indicator lights

The light flashes when the turn signal switch lever or hazard switch is turned on.

Vehicle Dynamic Control (VDC) off indicator light

The light comes on when the vehicle dynamic control off switch is pushed to OFF. This indicates that the vehicle dynamic control system is not operating.

When the 4L position is selected with the Four-Wheel Drive (4WD) shift switch, the VDC system is disabled and the VDC off

indicator light illuminates. (4WD models)

For additional information, see “Vehicle Dynamic Control (VDC) system” in the “5. Starting and driving” section of this manual.

AUDIBLE REMINDERS

Key reminder chime

A chime will sound if the driver side door is opened while the ignition switch is pushed to the ACC position. Make sure the ignition switch is pushed to the OFF position, and take the Intelligent Key with you when leaving the vehicle.

Light reminder chime

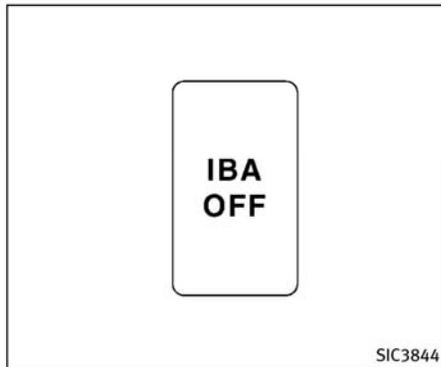
A chime will sound when the driver side door is opened with the light switch in the  or  position and the ignition switch in the ACC, OFF or LOCK position.

Turn the light switch off when you leave the vehicle.

The chime will also sound for 2 seconds when the ignition switch is turned to the OFF position with the fog lights on while the headlight switch is in the AUTO position.

7.1 OWNER'S MANUAL PAGES

INTELLIGENT BRAKE ASSIST (IBA) OFF SWITCH (if so equipped)



See "Intelligent Brake Assist (IBA) system" in the "5. Starting and driving" section.

The vehicle should be driven with the Intelligent Brake Assist (IBA) system on for most driving conditions.

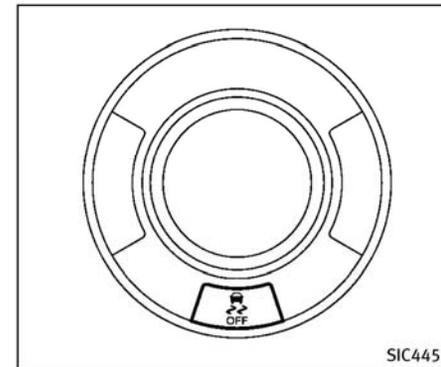
The Intelligent Brake Assist (IBA) system will sound a warning chime to alert the driver when the vehicle is traveling too close to the vehicle ahead and will apply the brake control if necessary.

To turn off the system, push the IBA OFF switch. The  indicator will illuminate.

The IBA system will remain in the last ON or OFF state it was left in until it is manually changed by pushing the IBA OFF switch.

2-50 Instruments and controls

VEHICLE DYNAMIC CONTROL (VDC) OFF SWITCH



The vehicle should be driven with the Vehicle Dynamic Control (VDC) system on for most driving conditions.

If the vehicle is stuck in mud or snow, the VDC system reduces the engine output to reduce wheel spin. The engine speed will be reduced even if the accelerator is depressed to the floor. If maximum engine power is needed to free a stuck vehicle, turn the VDC system off.

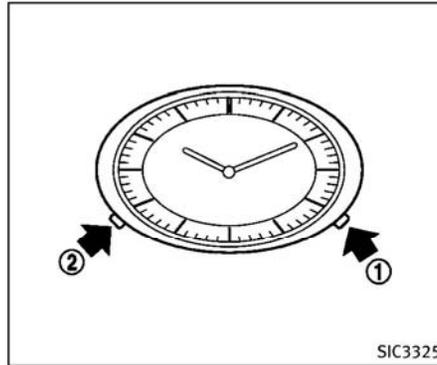
To turn off the VDC system, push the VDC OFF switch. The  indicator will illuminate.

Push the VDC OFF switch again or restart the engine to turn on the system. (See

7.1 OWNER'S MANUAL PAGES

"Vehicle Dynamic Control (VDC) system" in the "5. Starting and driving" section.)

CLOCK



phone and voice recognition systems" section.

If the power supply is disconnected, the clock will not indicate the correct time. Readjust the time.

ADJUSTING THE TIME

1. To set the clock forward, push the button ①.
2. To set the clock backward, push the button ②.
3. To move forward or backward faster, push and hold the button more than 5 seconds.

For details about display clock adjustment (if so equipped), see "How to use SETTING button" in the "4. Monitor, climate, audio,

Instruments and controls 2-51

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VEHICLE DYNAMIC CONTROL (VDC) SYSTEM

The Vehicle Dynamic Control (VDC) system uses various sensors to monitor driver inputs and vehicle motion. Under certain driving conditions, the VDC system helps to perform the following functions.

- Controls brake pressure to reduce wheel slip on one slipping drive wheel so power is transferred to a non slipping drive wheel on the same axle.
- Controls brake pressure and engine output to reduce drive wheel slip based on vehicle speed (traction control function).
- Controls brake pressure at individual wheels and engine output to help the driver maintain control of the vehicle in the following conditions:
 - understeer (vehicle tends to not follow the steered path despite increased steering input)
 - oversteer (vehicle tends to spin due to certain road or driving conditions).

The VDC system can help the driver to maintain control of the vehicle, but it cannot prevent loss of vehicle control in all driving situations.

When the VDC system operates, the VDC warning light  in the instrument panel

5-106 Starting and driving

flashes so note the following:

- The road may be slippery or the system may determine some action is required to help keep the vehicle on the steered path.
- You may feel a pulsation in the brake pedal and hear a noise or vibration from under the hood. This is normal and indicates that the VDC system is working properly.
- Adjust your speed and driving to the road conditions.

If a malfunction occurs in the system, the VDC warning light  illuminates in the instrument panel. The VDC system automatically turns off.

The VDC OFF switch is used to turn off the VDC system. The VDC off indicator  illuminates to indicate the VDC system is off. When the VDC switch is used to turn off the system, the VDC system still operates to prevent one drive wheel from slipping by transferring power to a non slipping drive wheel. The VDC warning light  flashes if this occurs. All other VDC functions are off, and the VDC warning light  will not flash. The VDC system is automatically reset to on when the ignition switch is placed in the off position then back to the

on position.

When the 4L position is selected with the 4WD shift switch, the VDC system is disabled and the VDC off indicator light illuminates (for 4WD models).

See “Vehicle Dynamic Control (VDC) warning light” in the “2. Instruments and controls” section and “Vehicle Dynamic Control (VDC) off indicator light” in the “2. Instruments and controls” section.

The computer has a built-in diagnostic feature that tests the system each time you start the engine and move the vehicle forward or in reverse at a slow speed. When the self-test occurs, you may hear a “clunk” noise and/or feel a pulsation in the brake pedal. This is normal and is not an indication of a malfunction.

WARNING

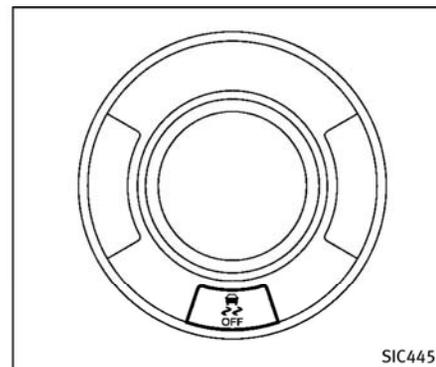
- The VDC system is designed to help improve driving stability but does not prevent accidents due to abrupt steering operation at high speeds or by careless or dangerous driving techniques. Reduce vehicle speed and be especially careful when driving and cornering on slippery

7.1 OWNER'S MANUAL PAGES

surfaces and always drive carefully.

- Do not modify the vehicle's suspension. If suspension parts such as shock absorbers, struts, springs, stabilizer bars, bushings and wheels are not INFINITI recommended for your vehicle or are extremely deteriorated, the VDC system may not operate properly. This could adversely affect vehicle handling performance, and the VDC warning light  may illuminate.
- If brake related parts such as brake pads, rotors and calipers are not INFINITI recommended or are extremely deteriorated, the VDC system may not operate properly and the VDC warning light  may illuminate.
- If engine control related parts are not INFINITI recommended or are extremely deteriorated, the VDC warning light  may illuminate.
- When driving on extremely inclined surfaces such as higher banked corners, the VDC system may not operate properly and the VDC warning light  may illuminate. Do not drive on these types of roads.

- When driving on an unstable surface such as a turntable, ferry, elevator or ramp, the VDC warning light  may illuminate. This is not a malfunction. Restart the engine after driving onto a stable surface.
- If wheels or tires other than the INFINITI recommended ones are used, the VDC system may not operate properly and the VDC warning light  may illuminate.
- The VDC system is not a substitute for winter tires or tire chains on a snow covered road.



VEHICLE DYNAMIC CONTROL (VDC) OFF SWITCH

The vehicle should be driven with the Vehicle Dynamic Control (VDC) system ON for most driving conditions.

When the vehicle is stuck in mud or snow, the VDC system reduces the engine output to reduce wheel spin. The engine speed will be reduced even if the accelerator is depressed to the floor. If maximum engine power is needed to free a stuck vehicle, turn the VDC system off.

To turn off the Vehicle Dynamic Control (VDC) system, push the VDC OFF switch.

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The VDC off indicator light  will illuminate.

Push the VDC OFF switch again or restart the engine to turn ON the system.

COLD WEATHER DRIVING

FREEING A FROZEN DOOR LOCK

To prevent a door lock from freezing, apply deicer through the key hole. If the lock becomes frozen, heat the key before inserting it into the key hole or use the Intelligent Key system.

ANTIFREEZE

In the winter when it is anticipated that the outside temperature will drop below 32°F (0°C), check antifreeze to assure proper winter protection. For additional information, see “Engine cooling system” in the “8. Maintenance and do-it-yourself” section.

BATTERY

If the battery is not fully charged during extremely cold weather conditions, the battery fluid may freeze and damage the battery. To maintain maximum efficiency, the battery should be checked regularly. For additional information, see “Battery” in the “8. Maintenance and do-it-yourself” section.

DRAINING OF COOLANT WATER

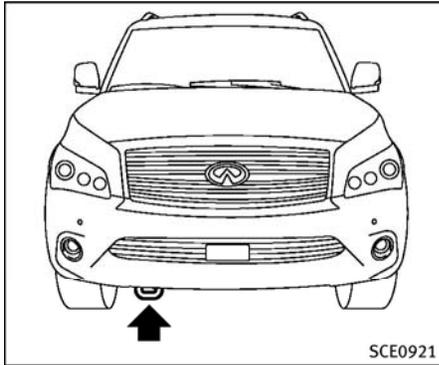
If the vehicle is to be left outside without antifreeze, drain the cooling system, including the engine block. Refill before operating the vehicle. For details, see “Engine cooling system” in the “8. Maintenance and do-it-yourself” section.

TIRE EQUIPMENT

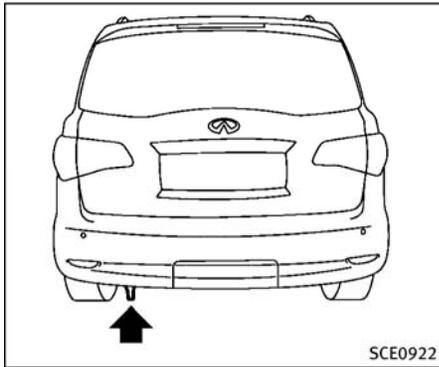
SUMMER tires have a tread designed to provide superior performance on dry pavement. However, the performance of these tires will be substantially reduced in snowy and icy conditions. If you operate your vehicle on snowy or icy roads, INFINITI recommends the use of MUD & SNOW or ALL SEASON tires on all four wheels. Consult an INFINITI retailer for the tire type, size, speed rating and availability information.

For additional traction on icy roads, studded tires may be used. However, some U.S. states and Canadian provinces prohibit their use. Check local, state and provincial laws before installing studded tires.

7.1 OWNER'S MANUAL PAGES



Front



Rear

VEHICLE RECOVERY (freeing a stuck vehicle)

WARNING

- Stand clear of a stuck vehicle.
- Do not spin your tires at high speed. This could cause them to explode and result in serious injury. Parts of your vehicle could also overheat and be damaged.

Pulling a stuck vehicle

If your vehicle is stuck in sand, snow, mud, etc., use a tow strap or other device designed specifically for vehicle recovery. Always follow the manufacturer's instructions for the recovery device.

Attach the tow strap to the recovery hook.

CAUTION

- Tow chains or cables must be attached only to the main structural members of the vehicle or the towing hooks. Otherwise, the vehicle body will be damaged.
- Use the towing hook only to free a vehicle stuck in sand, snow, mud, etc.

Never tow the vehicle for a long distance using only the towing hook.

- The towing hook is under tremendous force when used to free a stuck vehicle. Never pull the hook at an angle.
- Always pull the cable straight out from the front or rear of the vehicle.
- Pulling devices should be routed so they do not touch any part of the suspension, steering, brake or cooling systems.
- Pulling devices such as ropes or canvas straps are not recommended for use in vehicle towing or recovery.

Rocking a stuck vehicle

If your vehicle is stuck in sand, snow, mud, etc., use the following procedure:

1. Turn off the Vehicle Dynamic Control (VDC) system.
2. Make sure the area in front and behind the vehicle is clear of obstructions.
3. Turn the steering wheel right and left to clear an area around the front tires.
4. Slowly rock the vehicle forward and backward.

In case of emergency 6-17

7.1 OWNER'S MANUAL PAGES

Wheel balance

Unbalanced wheels may affect vehicle handling and tire life. Even with regular use, wheels can get out of balance. Therefore, they should be balanced as required.

Wheel balance service should be performed with the wheels off the vehicle. Spin balancing the wheels on the vehicle could lead to mechanical damage.

For additional information regarding tires, refer to "Important Tire Safety Information" (US) or "Tire Safety Information" (Canada) in the INFINITI Warranty Information Booklet.

Care of wheels

See "Cleaning exterior" in the "7. Appearance and care" section for details about care of the wheels.

Spare tire

When a spare tire is mounted (TEMPORARY USE ONLY or conventional), the TPMS will not function.

Spare tire (FULL-SIZE TEMPORARY USE ONLY spare tire) (Applies ONLY to vehicles equipped with P275/50R22 tires):

Observe the following precautions if the

full-size temporary use only spare tire must be used, otherwise your vehicle could be damaged or involved in an accident.

WARNING

- The full-size temporary use only spare tire should be used for emergency use. It should be replaced with the standard tire at the first opportunity to avoid possible tire or differential damage
- Drive carefully while the spare tire is installed. Avoid sharp turns and abrupt braking while driving. The vehicle driving performance may be affected when driving on wet or snow covered roads.
- When the spare tire is installed, the following systems may not work correctly.
 - Tire Pressure Monitoring System (TPMS)
 - Vehicle Dynamic Control (VDC) System
- Periodically check spare tire inflation pressure. Always keep the spare tire inflated to the pressure specification shown on the Tire and Loading Informa-

tion label. For Tire and Loading Information label location, see "Tire and Loading Information label" in the index of this manual.

- With the spare tire installed do not drive your vehicle at speeds faster than 50 MPH (80 km/h).
- When driving on roads covered with snow or ice, the spare tire should be used on the front wheels and original tire used on the rear wheels (drive wheels). Use tire chains only on the two rear original tires.
- Do not use the spare tire on other vehicles.
- Do not use more than one spare tire at the same time.

CAUTION

Do not use tire chains on the spare tire. Tire chains will not fit properly and may cause damage to the vehicle.

7.2 VEHICLE ARRIVAL CONDITION REPORT

CONTRACT NO.: DTNH22-08-D-00117

DATE: 5/4/2012

From: Automotive Allies

Purpose Initial Receipt

Received via Transfer

To: Dynamic Research, Inc

Present Vehicle Condition

Vehicle VIN: JN8AZ2NF9C9517577

NHTSA NO.: CC5202

Model Year: 2012

Odometer Reading: 13 Miles

Make Infiniti

Body Style: MPV

Model: QX56

Body Color: White

Manufacture Date: 2/12

Dealer: Automotive Allies

GVWR (kg/lb) 3266/7200

Price: Leased

- All options listed on the "Window Sticker" are present on the test vehicle
- Tires and wheel rims are new and the same as listed
- There are no dents or other interior or exterior flaws
- The vehicle has been properly prepared and is in running condition
- The glove box contains an owner's manual, warranty document, consumer information, and extra set of keys
- Proper fuel filler cap is supplied on the test vehicle
- Place vehicle in storage area
- Inspect the vehicle's interior and exterior, including all windows, seats, doors, etc., to confirm that each system is complete and functional per the manufacturer's specifications. Any damage, misadjustment, or other unusual condition that could influence the test program or test results shall be recorded. Report any abnormal condition to the NHTSA COTR before beginning any test.

NOTES:

RECORDED BY: J Lenkeit

DATE RECORDED: 5/4/2012

APPROVED BY: P Broen

DATE APPROVED: 5/15/2012

7.3 VEHICLE COMPLETION CONDITION REPORT

CONTRACT NO.: DTNH22-08-D-00117

DATE: 5/16/2012

Vehicle VIN: <u>JN8AZ2NF9C9517577</u>	NHTSA NO.: <u>CC5202</u>
Model Year: <u>2012</u>	Odometer Reading: <u>166</u> Miles
Make: <u>Infiniti</u>	Body Style: <u>MPV</u>
Model: <u>QX56</u>	Body Color: <u>White</u>
Manufacture Date: <u>2/12</u>	Dealer: <u>Automotive Allies</u>
GVWR (kg/lb) <u>3266 (7200)</u>	Price: <u>Leased</u>

LIST OF FMVSS TESTS PERFORMED BY THIS LAB: 126

- THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS
- THE VEHICLE HAS BEEN PROPERLY MAINTAINED AND IS IN RUNNING CONDITION
- THE GLOVE BOX CONTAINS AN OWNER'S MANUAL, WARRANTY DOCUMENT, CONSUMER INFORMATION, AND EXTRA SET OF KEYS
- PROPER FUEL FILLER CAP IS SUPPLIED ON THE TEST VEHICLE

REMARKS:

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

Explanation for equipment removal:

Test Vehicle Condition:

As delivered, like new

RECORDED BY: J Lenkeit DATE RECORDED: 5/16/2012

APPROVED BY: P Broen DATE APPROVED: 5/17/2012

7.4 SINE WITH DWELL TEST RESULTS

2012 Infiniti QX56

NHTSA No.: CC5202

Date of Test : 5/8/2012

Date Created: 5/8/2012

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

File	SWA @ 5deg Ct	MES	Time @ 5deg	COS	Time @ COS	MOS	Time @ MOS	YRR1	YR1	YRR 1 Ct	YRR 175	YR175	YRR17 5 Ct	2nd Yaw Peak	2nd Yaw Peak Ct	Lat Disp	Lat. Acc. 1.07 s	1st SWA Peak	1st SWA Peak Ct	2nd SWA Mean
	(deg)	(mph)	(s)		(s)		(sec)	(%)	(deg/s)		(%)	(deg/s)		(deg/s)		(ft)	(g)	(deg)		(deg)
21	710	50.21	3.541	1090	5.444	847	4.226	-1.52	-0.20	1290	0.47	0.06	1440	13.45	940	-3.99	0.36	55.06	775	54.99
22	708	50.09	3.535	1090	5.443	847	4.226	-1.82	-0.33	1290	-1.01	-0.18	1440	17.91	937	-5.09	0.44	73.04	775	72.81
23	708	50.26	3.532	1090	5.443	847	4.226	-0.79	-0.18	1290	-0.65	-0.15	1440	23.12	936	-6.10	0.47	91.93	775	91.69
24	707	50.05	3.530	1090	5.443	847	4.226	-1.29	-0.35	1290	-1.30	-0.36	1440	27.50	936	-7.21	0.48	109.81	775	109.39
25	707	50.01	3.527	1090	5.444	846	4.225	-0.34	-0.08	1290	-0.43	-0.10	1440	22.64	939	-7.99	0.28	128.91	775	128.78
26	707	50.27	3.527	1090	5.443	846	4.225	-0.53	-0.13	1290	-0.59	-0.15	1440	25.58	959	-8.50	0.30	147.07	775	146.59
27	707	50.21	3.527	1090	5.443	846	4.225	-0.18	-0.06	1290	-0.36	-0.12	1440	31.66	936	-8.81	0.31	165.03	775	164.61
28	707	50.00	3.527	1090	5.443	847	4.226	-0.10	-0.04	1290	-0.31	-0.11	1440	34.19	935	-8.89	0.30	184.28	776	183.56
29	707	50.05	3.527	1090	5.443	846	4.225	-0.18	-0.06	1290	-0.43	-0.14	1440	32.86	933	-8.74	0.42	202.17	775	201.41
30	707	50.21	3.527	1090	5.442	847	4.226	0.00	0.00	1290	-0.19	-0.07	1440	37.87	940	-8.99	0.28	220.50	776	219.61
31	707	49.98	3.528	1090	5.442	847	4.226	-0.19	-0.08	1290	-0.29	-0.11	1440	39.03	939	-9.15	0.25	239.31	776	238.68
32	707	50.22	3.528	1090	5.442	847	4.226	-0.28	-0.11	1290	-0.04	-0.01	1440	37.87	931	-9.01	0.43	257.15	777	256.57
33	707	50.05	3.528	1090	5.442	847	4.227	0.00	0.00	1290	0.19	0.07	1440	40.10	931	-8.91	0.43	269.15	778	269.59

7.4 SINE WITH DWELL TEST RESULTS

2012 Infiniti QX56

NHTSA No.: CC5202

Date of Test : 5/8/2012

Date Created: 5/8/2012

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

File	SWA @ 5deg Ct	MES	Time @ 5deg	COS	Time @ COS	MO S	Time @ MOS	YRR1	YR1	YRR 1 Ct	YRR 175	YR175	YRR17 5 Ct	2nd Yaw Peak	2nd Yaw Peak Ct	Lat Disp	Lat. Acc. 1.07 s	1st SWA Peak	1st SWA Peak Ct	2nd SWA Mean
	(deg)	(mph)	(s)		(s)		(sec)	(%)	(deg/s)		(%)	(deg/s)		(deg/s)		(ft)	(g)	(deg)		(deg)
34	709	50.06	3.540	1090	5.444	847	4.226	-2.15	0.29	1290	-0.80	0.11	1440	-13.35	938	3.94	-0.35	55.82	775	55.56
35	708	50.23	3.535	1090	5.443	847	4.226	-0.42	0.08	1290	0.02	0.00	1440	-18.43	939	5.08	-0.41	73.65	775	73.40
36	708	50.04	3.531	1090	5.442	847	4.226	0.15	-0.03	1290	0.17	-0.04	1440	-23.28	935	6.21	-0.45	92.55	775	92.29
37	707	50.43	3.528	1090	5.442	846	4.225	-0.42	0.12	1290	0.39	-0.11	1440	-29.04	938	7.07	-0.44	110.44	775	110.17
38	707	50.23	3.526	1090	5.443	847	4.226	0.72	-0.16	1290	0.51	-0.12	1440	-22.62	930	7.77	-0.28	129.61	775	129.33
39	707	50.16	3.526	1090	5.442	846	4.225	0.46	-0.12	1290	0.53	-0.14	1440	-25.44	955	8.10	-0.29	147.69	775	147.28
40	707	50.19	3.526	1090	5.443	847	4.226	1.26	-0.36	1290	0.81	-0.23	1440	-28.41	953	8.21	-0.28	165.72	775	165.21
41	707	50.24	3.527	1090	5.443	847	4.226	0.08	-0.02	1290	0.08	-0.03	1440	-31.52	941	8.36	-0.34	184.65	776	184.37
42	707	50.19	3.526	1090	5.442	847	4.226	0.32	-0.10	1290	0.10	-0.03	1440	-32.40	938	8.30	-0.44	202.65	775	202.20
43	707	50.05	3.526	1090	5.442	847	4.226	0.09	-0.03	1290	0.17	-0.06	1440	-33.68	937	8.41	-0.40	220.88	775	220.40
44	707	50.12	3.526	1089	5.440	847	4.226	0.41	-0.16	1289	0.51	-0.20	1439	-38.07	931	8.47	-0.52	239.73	776	239.40
45	707	50.21	3.527	1090	5.441	847	4.227	-0.30	0.12	1290	-0.13	0.05	1440	-41.08	933	8.56	-0.44	257.20	777	257.36
46	707	50.13	3.527	1090	5.441	847	4.227	-0.12	0.05	1290	-0.10	0.04	1440	-40.34	932	8.47	-0.48	269.71	777	270.17

7.5 SLOWLY INCREASING STEER TEST RESULTS

2012 Infiniti QX56

NHTSA No.: CC5202

Date of Test: 5/8/2012

Date Created: 5/8/2012

File	EventPt	DOS	MES (mph)	Mean SPD (mph)	AYcount_3	THETAENCF_3 (deg)	AYCG_CD2_3 (g)	r_squared	ZeroBegin	ZeroEnd
10	720	1	50.184	50.256	1246	-36.439	-0.307	0.998	520	720
11	700	1	50.230	50.239	1257	-37.216	-0.295	0.997	500	700
12	700	1	50.177	50.320	1262	-37.513	-0.300	0.997	500	700
13	700	0	50.284	50.285	1243	36.284	0.302	0.997	500	700
14	700	0	50.426	50.320	1240	36.307	0.304	0.997	500	700
15	700	0	50.066	50.213	1246	36.655	0.299	0.996	500	700

Averages

36.7

0.301

Scalars	Steering Angles (deg)
1.5	55
2.0	73
2.5	92
3.0	110
3.5	128
4.0	147
4.5	165
5.0	184

Scalars	Steering Angles (deg)
5.5	202
6.0	220
6.5	239
7.0	257
7.4	270

7.6 INERTIAL SENSING SYSTEM LOCATION COORDINATES

Vehicle: **2012 Infiniti QX56**

NHTSA No.: CC5202

Wheelbase: 121.2 Inches

Faro Arm S/N: U08-05-08-06636

Measurement date: 5/4/2012

Certification date: 11/2/2011

CMM Measurements

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

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

	Ref X	Ref Y	Ref Z
M_PLANE001_Ground_Plane	-	-	0.000
M_Line_Y_Axis	2.508		0.000
M_Point_48_Ref	0.000	0.000	-
M_CIRCLE001_I_Left_Rear_Wheel_Axle	-35.616	9.331	-15.535
M_Point_IMU_side	8.698	45.597	-27.631
M_Point_ROOF	-	-	-75.198
Motion Pak reference point taken from mid height of unit left side			
Motion Pak Width = 3.05" ==> 1/2 W = 1.525			
Motion_PAK_Location	8.698	47.122	-27.631

Measurement Notes

1. The Faro arm is positioned just to the left of the vehicle, near the rear door.
2. A "centerline jig" is used in the Faro arm measurement. The jig consists of a long beam with a 4 ft lateral arm that is perpendicular to the beam. The jig is placed on the ground underneath the vehicle with the long beam positioned along the centerline of the vehicle, such that the lateral arm extends to the left, slightly forward of the left rear tire. The lateral arm has a marked indentation point which is located 48.00" from the edge of the centerline beam.
3. The Faro arm is used to make the following measurements:
 - Three points on the ground, which establishes the ground plane.
 - Two points along the lateral arm, and projected onto the ground plane. This establishes the y axis.
 - One point at the 48 inch reference point on the lateral arm. This establishes the origin.
 - Three points on the left rear wheel or wheel cover. The Faro arm then computes the center point of the wheel.
 - One point to establish the height of the highest point on the roof of the vehicle.

Coordinate Measurements Calculated for S7D (Matlab Program)

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

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

	Ref X	Ref Y	Ref Z
Motion_PAK_Location in S7D (Matlab program) coordinate system	76.886	-0.878	27.631

Calculation Notes:

1. X axis value is the difference between the wheelbase and the calculated distance from the rear axle centerline to the IMU (the value must be positive and less than the wheelbase).
2. Y axis value is -48.00 (the Y axis offset of the measurement origin in the S7D coordinate system) plus the measured Y axis value (a negative value indicates the IMU is to the left of the vehicle centerline, and a positive value indicates it is to the right)
3. Z axis value is from the ground plane up to the center of the IMU (value must be positive).