126-DRI-09-004

SAFETY COMPLIANCE TESTING FOR FMVSS 126
Electronic Stability Control Systems

Infiniti
2009 FX35
NHTSA No. C95209

DYNAMIC RESEARCH, INC.
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November 18, 2009

FINAL REPORT

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

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
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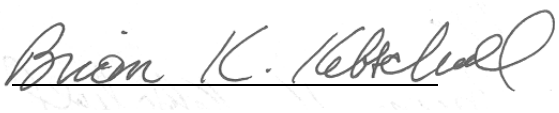
Prepared By: 

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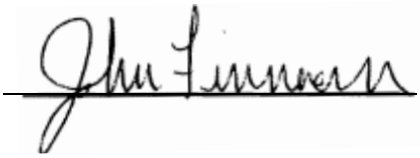
Accepted By: 

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16. Abstract A test was conducted on a 2009 Infiniti FX35, NHTSA No. C95209, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-126-02 for the determination of FMVSS 126 compliance. Test failures identified were as follows: None			
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this test is to determine if the test vehicle, a 2009 Infiniti FX35, meets the minimum equipment and performance requirements stated in Federal Motor Vehicle Safety Standard (FMVSS) 126, "Electronic Stability Control Systems."

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS

Testing of the 2009 Infiniti FX35 was conducted at Dynamic Research, Inc (DRI) in accordance with NHTSA TP-126-02, dated November 19, 2008.

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

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

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

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

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTINUED)

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

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

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

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

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTD)

Data Summary Sheet (Page 1 of 2)

Vehicle: *2009 Infiniti FX35*

NHTSA No *C95209* VIN: *JNRAS18UX9M103668*

Vehicle Type: *MPV* Manufacture Date: *6/09*

Laboratory: *Dynamic Research, Inc.*

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

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTD)

Data Summary Sheet (Page 2 of 2)

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

3.0 TEST DATA

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

Vehicle: *2009 Infiniti FX35 :MPV*

NHTSA No *C95209* Data sheet completion date: *9/7/2009*

VIN: *JNRAS18UX9M103668* Manufacture Date: *6/09*

GVWR (kg): *2405* Front GAWR (kg): *1118* Rear GVWR (kg): *1295*

Seating Positions Front: *2* Mid: *0* Rear: *3*

Odometer reading at time of inspection: *57 (92) miles (km)*

DESIGNATED TIRE SIZE(S) FROM VEHICLE LABELING:

Front Axle: *P265/60 R18* Rear Axle: *P265/60 R18*

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

		Front Axle	Rear Axle
	Tire Manufacturer:	*Bridgestone*	*Bridgestone*
	Tire Model:	*Dueler H/P 92A*	*Dueler H/P 92A*
	Tire Size:	*P265/60 R18*	*P265/60 R18*
TIN	Left Front:	*ELXT CJJ 4808*	Right Front: *ELXT CJJ 4708*
	Left Rear:	*ELXT CJJ 4808*	Right Rear: *ELXT CJJ 4808*

Are installed tire sizes same as labeled tire sizes? *Yes*
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 no locked full time (4WD Automatic)

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

☐ Four Wheel Drive Low Gear (4WD Low)

☐ Other Describe

3.0 TEST DATA (CONTD)

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

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

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

Drive Configuration: *2WD*
Mode: *Default*
Drive Configuration:
Mode:
Drive Configuration:
Mode:

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: *J Brubacher* DATE RECORDED: *9/7/2009*

APPROVED BY: *J Lenkeit* DATE APPROVED: *10/1/2009*

3.0 TEST DATA (CONTD)

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

Vehicle: *2009 Infiniti FX35*

NHTSA No *C95209* Data Sheet Completion Date: *9/7/2009*

ESC SYSTEM IDENTIFICATION

Manufacturer/Model *Bosch ESP8*

ESC SYSTEM HARDWARE (Check applicable hardware)

☑ Electronic Control Unit ☑ Hydraulic Control Unit

☑ Wheel Speed Sensors ☑ Steering Angle Sensor

☑ Yaw Rate Sensor ☑ Lateral Acceleration Sensor

List other Components: *Engine management ECU*

ESC OPERATIONAL CHARACTERISTICS

System is capable of generating brake torque at each wheel — *_X_ Yes (Pass) ____ No (Fail)*
List and describe Components: *Hydraulic modulator with Engine management ECU can command individual brake torques to hydraulic control unit and individual brakes*

System is capable of determining yaw rate — *_X_ Yes (Pass) ____ No (Fail)*
List and describe Components: *Yaw sensor*

System is capable of monitoring driver steering input — *_X_ Yes (Pass) ____ No (Fail)*
List and describe Components: *Steering angle sensor*

System is capable of estimating side slip or side slip derivative — *_X_ Yes (Pass) ____ No (Fail)*
List and describe Components: *Yaw Rate & Lateral Acceleration sensor, Steering Angle sensor, Logic*

3.0 TEST DATA (CONTD)

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

ESC OPERATIONAL CHARACTERISTICS (continued)

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

Method used to modify torque: *Electronic management ECU*

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

Speed system becomes active: *14.4* km/h

System is capable of activation during the following driving phases. — _X_ *Yes (Pass)* / ____ *No (Fail)*

Driving phases during which ESC is capable of activation:
Acceleration, deceleration, coasting, during activation of ABS and during activation of ABS or Traction Control

Vehicle manufacturer submitted documentation explaining how the ESC mitigates understeer — _X_ *Yes (Pass)* / ____ *No (Fail)*

DATA INDICATES COMPLIANCE: _X_ *Yes (Pass)* / ____ *No (Fail)*

REMARKS:

RECORDED BY: *J Brubacher* DATE RECORDED: *9/7/2009*

APPROVED BY: *J Lenkeit* DATE APPROVED: *10/1/2009*

3.0 TEST DATA (CONTD)

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

Make: *Infiniti* Model: *FX35* Body Style: *MPV*

NHTSA No *C95209* Data sheet completion date: *9/7/2009*

ESC Malfunction Telltale

Vehicle is equipped with malfunction telltale? *Yes*

Telltale Location *Center of instrument panel (Figure 5.6)*

Telltale Color *Yellow*

Telltale symbol or abbreviation used

or **ESC**

☐ Vehicle uses this symbol

☐ Vehicles uses this abbreviation

☑ Neither symbol or abbreviation is used

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

Refer to Figure 5.6. The vehicle's malfunction telltales are located in the center of tachometer and center of the dashboard. The vehicle identifies a malfunction by illuminating two separate telltales simultaneously. One telltale is the symbol of the vehicle sliding, and the other telltale is the abbreviations "VDC OFF."

Is telltale part of a common space? *No*

Is telltale also used to indicate activation of the ESC system? *Yes (see below)*

If yes explain telltale operation during ESC activation:

When the ESC is activated, the vehicle sliding symbol shown above flashes.

3.0 TEST DATA (CONTD)

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

"ESC OFF" Telltale (if provided)

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

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

Telltale Location *Instrument panel in center portion of tachometer (Figure 5.6)*

Telltale Color *Yellow*

Telltale symbol or abbreviation used

or **ESC OFF**

☐ 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.

"VDC OFF" is the telltale used to identify the ESC system has been turned off (see Figure 5.6).

Is telltale part of a common space? *No*

DATA INDICATES COMPLIANCE: ***Pass***

(Vehicle is compliant if equipped with a malfunction telltale)

Remarks:

RECORDED BY: *J Brubacher* DATE RECORDED: *9/8/2009*

APPROVED BY: *B Kebschull* DATE APPROVED: *10/2/2009*

3.0 TEST DATA (CONTD)

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

Make: *Infiniti* Model: *FX35* Body Style: *MPV*

NHTSA No *C95209* Data sheet completion date: *9/8/2009*

"ESC OFF" Controls Identification and Operational Check:

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

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

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

Identify each control location, labeling and selectable modes.

First Control: Location *Below instrument cluster on left (Figure 5.7)*
Labeling *VDC OFF*
Modes *VDC ON/OFF*

Second Control: Location _____
Labeling _____
Modes _____

Identify standard or default drive configuration *RWD*

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")

X Yes ___ No (Fail)

If no, describe how the off control functions

3.0 TEST DATA (CONTD)

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

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

Control Mode	"ESC Off" telltale illuminates upon activation of control? (Yes/No)	"ESC Off" telltale extinguishes upon cycling ignition? (Yes/No)
No multi-function controls provided		

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? _____Yes _____No

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

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

_____Yes _____No

Ancillary Control: System *None*

Control Description _____

Labeling _____

Ancillary Control: System _____

Control Description _____

Labeling _____

Ancillary Control: System _____

Control Description _____

Labeling _____

3.0 TEST DATA (CONTD)

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

Activate each 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
None		

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

Ancillary Control	"ESC Off" telltale extinguishes upon cycling ignition? (Yes/No)
None	

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.

__X__ Yes _____ No (Fail)

DATA INDICATES COMPLIANCE: ***Pass***

Remarks:

RECORDED BY: *B Kebschull* DATE RECORDED: *9/8/2009*

APPROVED BY: *J Lenkeit* DATE APPROVED: *10/2/2009*

3.0 TEST DATA (CONTD)

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

Make: *Infiniti* Model: *FX35* Body Style: *MPV*

NHTSA No *C95209* Data sheet completion date: *9/15/2009*

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

Peak Friction Coefficient (at least 0.9) *0.95*

Test track data meets requirements: *Yes*

If no, explain:

Full Fluid Levels: Fuel *Yes* Coolant *Yes* Other Fluids *Yes*

(specify) *Oil, ATF*

Tire Pressures: Required; Front Axle *230* KPA Rear Axle *230* KPA

Actual; LF *230* KPA RF *230* KPA

LR *230* KPA RR *230* KPA

Vehicle Dimensions: Front Track Width *163* cm Wheelbase *287.7* cm

Rear Track Width *163* cm

Vehicle Weight Ratings: GAWR Front *1118* KG GAWR Rear *1295* KG

Unloaded Vehicle Weight (UVW):

Front axle	*981*	KG	Left Front	*500*	KG	Right Front	*482*	KG
Rear axle	*924*	KG	Left Rear	*453*	KG	Right Rear	*471*	KG

Total UVW *1906* KG

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

Calculated baseline weight (UVW + 73kg) *1979* KG

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

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

3.0 TEST DATA (CONTD)

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

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

Front axle	*1025* KG	Left Front	*520* KG	Right Front	*505* KG
Rear axle	*980* KG	Left Rear	*484* KG	Right Rear	*496* KG

Total UVW with outriggers *2005* KG

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

Front axle	*1102* KG	Left Front	*571* KG	Right Front	*531* KG
Rear axle	*1067* KG	Left Rear	*533* KG	Right Rear	*534* KG

Vehicle Weight *2169* KG

Ballast Required =

[Total UVW with Outriggers (if applicable)]	+ *168* KG	- [Loaded Weight w/Driver and Instrumentation)]
= 2005 KG	+ *168* KG	*-2169* KG

= *4* KG

Total Loaded Vehicle Weight w/Driver and Instrumentation and Ballast

Front axle	*1103* KG	Left Front	*571* KG	Right Front	*532* KG
Rear axle	*1069* KG	Left Rear	*533* KG	Right Rear	*536* KG

Total UVW *2172* KG

3.0 TEST DATA (CONTD)

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

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

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

Locations:

	Center of Gravity		Inertial Sensing System	
x-distance	*55.7* in	*141.5* cm	*76.20* in	*193.5* cm
y-distance	*-0.5* in	*-1.4* cm	*0.15* in	*0.4* cm
z-distance	*24.4* in	*62* cm	*23.05* in	*58.5* cm

Roof Height	*64.2*	in	*163.1*	cm
Distance between ultrasonic sensors	*91*	in	*231.1*	cm

Remarks:

RECORDED BY: *B Kebschull* DATE RECORDED: *9/8/2009*

APPROVED BY: *J Lenkeit* DATE APPROVED: *10/2/2009*

3.0 TEST DATA (CONTD)

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

Make: *Infiniti* Model: *FX35* Body Style: *MPV*

NHTSA No *C95209*

Measured tire pressure: LF *230* KPA RF *230* KPA

LR *230* KPA RR *230* KPA

Wind Speed *1.5* m/s (10 m/sec (22 mph) max for passenger cars; 5m/sec (11 mph) max for MPVs and trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *22* °C

Brake Conditioning Time: *9:07:00 AM* Date: *9/16/2009*

56 km/h (35 mph) Brake Stops

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

Observed deceleration rate range (.5g target) *0.5 – 0.6* 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 *0.8 - 0.9* g

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

Duration of cool down period (5 minutes min.) *6* Minutes

3.0 TEST DATA (CONTD)

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

Tire Conditioning series No. 1 Time: *9:20:00 AM* Date: *9/16/2009*

Measured cold tire pressure LF *241* KPA RF *243* KPA

LR *245* KPA RR *244* KPA

Wind Speed *1.6* m/s (10 m/sec (22 mph) max for passenger cars; 5m/sec (11 mph) max for MPVs and trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *23*°C

30 meter (100 ft) Diameter Circle Maneuver				
Test Run	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral (g)	Observed Vehicle Speed (Km/h)
1-3	Clockwise	0.5 – 0.6	*0.5 – 0.6*	*32 - 34*
4-6	Counterclockwise	0.5 – 0.6	*0.5 – 0.6*	*32 - 34*

5-1 Hz Cycle Sinusoidal Steering Maneuver to Determine Steering Wheel Angle for 0.5-0.6 g Lateral Acceleration					
Test Run	Data File	Vehicle Speed Km/h(mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1	2	56 ± 2 (35 ± 1)	*60*	0.5 - 0.6	*0.46*
2	3	56 ± 2 (35 ± 1)	*70*	0.5 - 0.6	*0.52*
3		56 ± 2 (35 ± 1)		0.5 - 0.6	
4		56 ± 2 (35 ± 1)		0.5 - 0.6	

Steering wheel angle that corresponds to a peak 0.5-0.6 g lateral acceleration: *70* degrees

10-1 Hz Cycle Sinusoidal Steering Maneuver					
Test Run	Data File	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1-3	4-6	56 ± 2 (35 ± 1)	*70* (cycles 1-10)	0.5 - 0.6	*0.55*
4	7	56 ± 2 (35 ± 1)	*70* (cycles 1-9)	0.5 - 0.6	*0.55*
			140 (cycle10)*	NA	*0.74*

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

3.0 TEST DATA (CONTD)

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

Tire Conditioning series No. 2 Time: *11:43:00 AM* Date: *9/16/2009*

Measured cold tire pressure LF *245* KPA RF *243* KPA

LR *252* KPA RR *247* KPA

Wind Speed *1.5* m/s (10 m/sec (22 mph) max for passenger cars; 5m/sec (11 mph) max for MPVs and trucks)

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

30 meter (100 ft) Diameter Circle Maneuver				
Test Run	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral (g)	Observed Vehicle Speed (Km/h)
1-3	Clockwise	0.5 - 0.6	*.05 - 0.6*	*32 - 34*
4-6	Counterclockwise	0.5 - 0.6	*.05 - 0.6*	*32 - 34*

Steering wheel angle that corresponds to a peak 0.5-0.6 g lateral acceleration: *70*

10-1 Hz Cycle Sinusoidal Steering Maneuver					
Test Run	Data File	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1-3	16-18	56 ± 2 (35 ± 1)	*70* (cycles 1-10)	0.5 - 0.6	*0.52*
4	19	56 ± 2 (35 ± 1)	*70* (cycles 1-9)	0.5 - 0.6	*0.52*
			140 (cycle10)*	NA	*0.80*

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

Remarks:

RECORDED BY: *B Kebschull* DATE RECORDED: *9/16/2009*

APPROVED BY: *J Lenkeit* DATE APPROVED: *10/1/2009*

3.0 TEST DATA (CONTD)

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

Make: *Infiniti* Model: *FX35* Body Style: *MPV*

NHTSA No *C95209*

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

LR *248* KPA RR *246* KPA

Wind Speed *1.2* m/s

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

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *24*°C

Selected drive configuration *2WD (default)*

Selected Mode: *Normal*

Preliminary Left Steer Maneuver:

Lateral Acceleration measured at 30 degrees steering wheel angle

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

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

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

δ_{sis} = *46* degrees (@.55g)

δ_{sis} = *50* degrees (rounded)

Steering Wheel Angle at Corrected 0.3g Lateral Acceleration:

Maneuver	Initial Steer Direction	Time Clock	Steering Wheel Angle to nearest 0.1 (degrees)	Data Run	Good/NG
1	Left	*10:08:00 AM*	-30.12	10	*Good*
2	Left	*10:11:00 AM*	-30.19	11	*Good*
3	Left	*10:14:00 AM*	-29.77	12	*Good*
	Left				
	Left				
4	Right	*10:17:00 AM*	30.09	13	*Good*
5	Right	*10:20:00 AM*	29.78	14	*Good*
6	Right	*10:24:00 AM*	29.61	15	*Good*
	Right				
	Right				

3.0 TEST DATA (CONTD)

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

Average Overall Steering Wheel Angle:

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

$\delta_{0.3\,g,\,overall}$ = 29.9 degrees

[to nearest 0.1 degree]

Remarks:

RECORDED BY: *B Kebschull* DATE RECORDED: *9/16/2009*

APPROVED BY: *J Lenkeit* DATE APPROVED: *10/1/2009*

3.0 TEST DATA (CONTD)

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

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: *2WD (default)*

Selected Mode: *default*

Overall steering wheel angle ($\delta_{0.3\ g,\ overall}$) *29.9* degrees

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

Maneuver #	Clock Time (1.5 – 5.0 min max between runs)	Commanded Steering Wheel Angle[1]		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [≤ 35%]		YRR at 1.75 sec after COS [≤ 20%]	
		Scalar (* $\delta_{0.3\ g}$)	Angle (degrees)	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/Fail	%	Pass/Fail
1	11:10:00 AM	1.5	45	12.5	-0.2	-0.2	-1.4	*PASS*	-1.2	*PASS*
2	11:13:00 AM	2	60	16.9	-0.1	-0.1	-0.7	*PASS*	-0.8	*PASS*
3	11:16:00 AM	2.5	75	20.9	-0.5	-0.3	-2.4	*PASS*	-1.2	*PASS*
4	11:19:00 AM	3	90	26.5	-0.6	-0.3	-2.4	*PASS*	-1.2	*PASS*
5	11:22:00 AM	3.5	105	33.1	-0.4	-0.2	-1.1	*PASS*	-0.7	*PASS*
6	11:25:00 AM	4	120	41.0	0.3	-0.2	0.7	*PASS*	-0.4	*PASS*
7	11:27:00 AM	4.5	135	43.2	-0.4	-0.1	-0.9	*PASS*	-0.2	*PASS*
8	11:30:00 AM	5	150	45.8	-0.2	-0.2	-0.4	*PASS*	-0.4	*PASS*
9	11:32:00 AM	5.5	164	48.8	-0.3	-0.1	-0.6	*PASS*	-0.3	*PASS*
10	11:35:00 AM	6	179	52.7	0.2	0.0	0.4	*PASS*	-0.1	*PASS*
11	11: 38:00 AM	6.5	194	56.6	2.9	-0.2	5.1	*PASS*	-0.3	*PASS*
12	11: 41:00 AM	7	209	58.7	1.7	-0.2	2.9	*PASS*	-0.3	*PASS*
13	11:44:00 AM	7.5	224	57.4	0.8	-0.1	1.5	*PASS*	-0.1	*PASS*
14	11:48:00 AM	8	239	60.6	0.9	-0.3	1.5	*PASS*	-0.5	*PASS*
15	11:51:00 AM	8.5	254	59.6	1.7	-0.2	2.8	*PASS*	-0.3	*PASS*
16	11:56:00 AM	9	269	61.0	1.4	-0.4	2.3	*PASS*	-0.6	*PASS*
17	12:00:00 PM	9.03	270	58.6	-0.1	-0.2	-0.2	*PASS*	-0.3	*PASS*

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

3.0 TEST DATA (CONTD)

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

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

Maneuver #	Clock Time (1.5 – 5.0 min max between runs)	Commanded Steering Wheel Angle[1]		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [< 35%]		YRR at 1.75 sec after COS [< 20%]	
		Scalar (* $\delta_{0.3\ g}$)	Angle (degrees)	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/Fail	%	Pass/Fail
18	12:05:00 PM	1.5	45	-13.1	-0.2	-0.2	1.8	*PASS*	1.8	*PASS*
19	12:09:00 PM	2	60	-17.9	0.0	-0.1	0.2	*PASS*	0.4	*PASS*
20	12:13:00 PM	2.5	75	-22.7	-0.1	-0.3	0.3	*PASS*	1.3	*PASS*
21	12:16:00 PM	3	90	-27.3	0.0	0.0	0.1	*PASS*	-0.1	*PASS*
22	12:19:00 PM	3.5	105	-33.4	-0.2	-0.1	0.6	*PASS*	0.3	*PASS*
23	12:23:00 PM	4	120	-38.8	-0.4	0.1	1.0	*PASS*	-0.1	*PASS*
24	12:26:00 PM	4.5	135	-44.4	-2.4	-0.1	5.3	*PASS*	0.2	*PASS*
25	12:29:00 PM	5	150	-45.3	0.3	0.2	-0.6	*PASS*	-0.4	*PASS*
26	12:32:00 PM	5.5	164	-48.7	0.1	0.1	-0.1	*PASS*	-0.3	*PASS*
27	12:35:00 PM	6	179	-52.4	-0.3	0.1	0.7	*PASS*	-0.2	*PASS*
28	12:38:00 PM	6.5	194	-55.2	-0.7	-0.1	1.3	*PASS*	0.2	*PASS*
29	12:41:00 PM	7	209	-56.1	-1.2	-0.2	2.2	*PASS*	0.3	*PASS*
30	12:45:00 PM	7.5	224	-56.4	-0.2	0.2	0.3	*PASS*	-0.3	*PASS*
31	12:48:00 PM	8	239	-60.6	-2.4	-0.1	4.0	*PASS*	0.2	*PASS*
32	12:52:00 PM	8.5	254	-61.3	-1.6	0.1	2.6	*PASS*	-0.0	*PASS*
33	12:56:00 PM	9	269	-59.4	-0.3	0.1	0.6	*PASS*	-0.1	*PASS*
34	12:59:00 PM	9.03	270	-61.9	-1.5	-0.2	2.5	*PASS*	0.3	*PASS*

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

During execution of the sine with dwell maneuvers were any of the following events observed?

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

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

3.0 TEST DATA (CONTD)

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

Responsiveness – Lateral Displacement

Maneuver #	Initial Steer Direction	Commanded Steering Wheel Angle ($5.0*\delta_{0.3\ g,\ overall}$ or greater)		Calculated Lateral Displacement[1]	
		Scalar $*\delta_{0.3\ g}$	Angle (degrees)	Distance (m)	Pass/Fail
8	Counterclockwise	5.0	150	-3.3	*PASS*
9	Counterclockwise	5.5	164	-3.3	*PASS*
10	Counterclockwise	6.0	179	-3.3	*PASS*
11	Counterclockwise	6.5	194	-3.4	*PASS*
12	Counterclockwise	7.0	209	-3.4	*PASS*
13	Counterclockwise	7.5	224	-3.3	*PASS*
14	Counterclockwise	8.0	239	-3.4	*PASS*
15	Counterclockwise	8.5	254	-3.4	*PASS*
16	Counterclockwise	9.0	269	-3.3	*PASS*
17	Counterclockwise	9.5	270	-3.4	*PASS*
25	Clockwise	5.0	151	3.0	*PASS*
26	Clockwise	5.5	165	3.1	*PASS*
27	Clockwise	6.0	180	3.1	*PASS*
28	Clockwise	6.5	195	3.2	*PASS*
29	Clockwise	7.0	210	3.2	*PASS*
30	Clockwise	7.5	225	3.2	*PASS*
31	Clockwise	8.0	240	3.2	*PASS*
32	Clockwise	8.5	255	3.2	*PASS*
33	Clockwise	9.0	270	3.2	*PASS*
34	Clockwise	9.5	271	3.2	*PASS*

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

DATA INDICATES COMPLIANCE: ☑ PASS ☐ FAIL

Remarks:

RECORDED BY: *B Kebschull* DATE RECORDED: *9/16/2009*

APPROVED BY: *J Lenkeit* DATE APPROVED: *10/1/2009*

3.0 TEST DATA (CONTD)

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

Make: *Infiniti* Model: *FX35* Body Style: *MPV*

NHTSA No *C95209* Data Sheet Completion Date: *9/16/2009*

TEST 1

METHOD OF MALFUNCTION SIMULATION:

Describe method of malfunction simulation:

1st – left front wheel speed sensor

MALFUNCTION TELLTALE ILLUMINATION:

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

X Yes ____ No

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

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

ESC SYSTEM RESTORATION

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

X Yes ____ No

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

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

TEST 1 DATA INDICATES COMPLIANCE: PASS/FAIL

Remarks: *No driving was required to activate the telltale. Vehicle was driven approximately 30 m to clear the telltale.*

RECORDED BY: *B Kebschull* DATE RECORDED: *9/16/2009*

APPROVED BY: *J Lenkeit* DATE APPROVED: *10/1/2009*

3.0 TEST DATA (CONTD)

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

Make: *Infiniti* Model: *FX35* Body Style: *MPV*

NHTSA No *C95209* Data Sheet Completion Date: *9/16/2009*

TEST 2

METHOD OF MALFUNCTION SIMULATION:

Describe method of malfunction simulation:

Disconnect steering wheel angle sensor

MALFUNCTION TELLTALE ILLUMINATION:

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

X Yes ____ No

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

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

ESC SYSTEM RESTORATION

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

X Yes ____ No

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

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

TEST 2 DATA INDICATES COMPLIANCE: PASS/FAIL

Remarks: *No driving was required to activate the telltale. Vehicle was driven approximately 30 m to clear the telltale.*

RECORDED BY: *B Kebschull* DATE RECORDED: *9/16/2009*

APPROVED BY: *J Lenkeit* DATE APPROVED: *10/1/2009*

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: Innocal Date:1/15/09 Due: 1/15/10
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: Intercomp Date:1/29/09 Due: 1/29/10
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: Heitz Date:1/29/09_ Due: 1/29/10
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:12/11/08 Due: 12/11/09
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: ADAT Date:1/5/09 Due:1/5/10
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:3/16/09 Due: 3/16/10
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 D2647	By: DRI Date:3/16/09 Due: 3/16/10

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: Somat Date:1/13/09 Due: 1/14/10
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 High level Board EHLS	MSHLS.03-3182	By: Somat Date:1/14/09 Due: 1/15/10
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	By: Davis Date:2/3/09 Due: 2/3/10
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	Q12-05-08-06717	By: Faro Date: 2/11/09 Due: 2/11/10
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

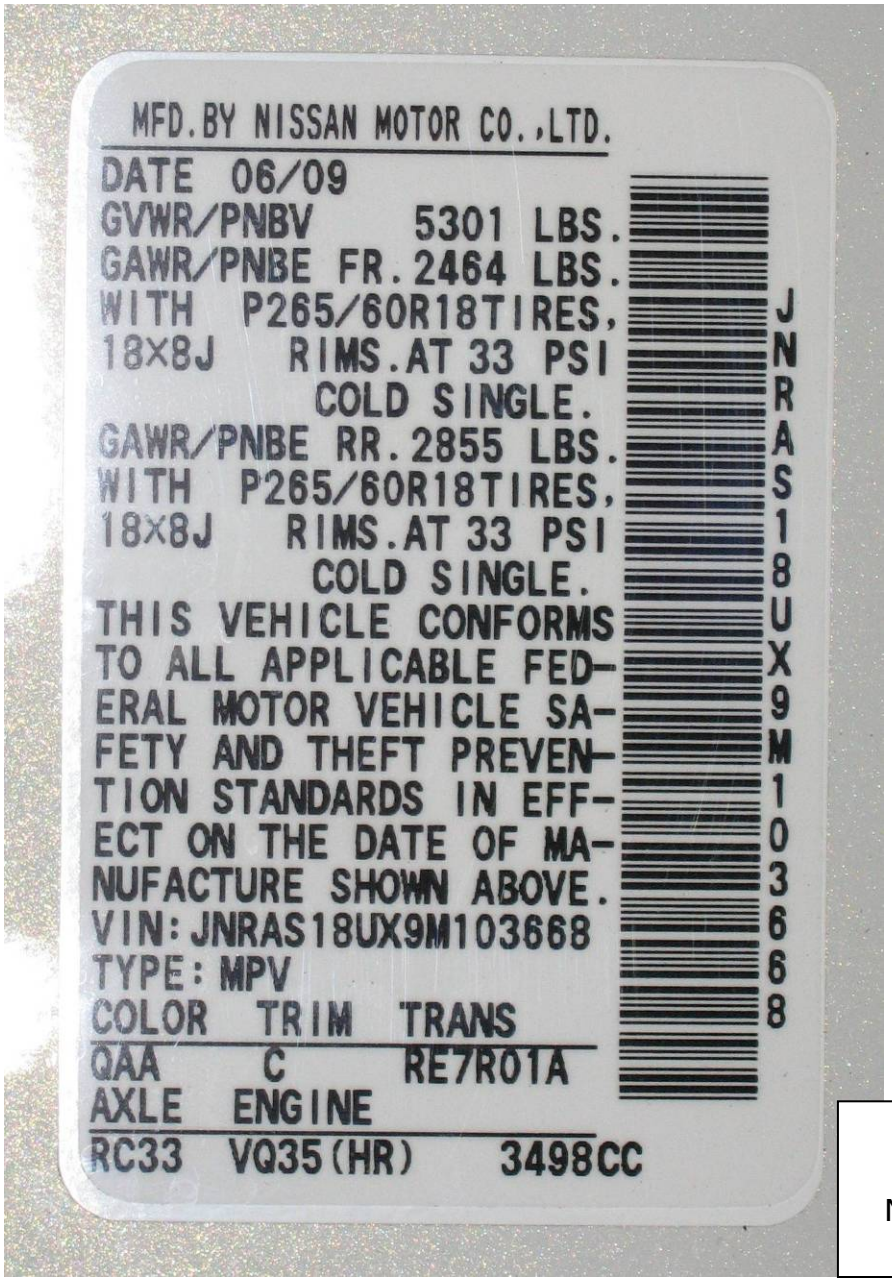
5.0 PHOTOGRAPHS (1 of 14)

Figure 5.1. Left Front View of Test Vehicle

5.0 PHOTOGRAPHS (2 of 14)

Figure 5.2. Right Rear View of Test Vehicle

5.0 PHOTOGRAPHS (3 of 14)



2009 Infiniti FX35
FMVSS No. 126
NHTSA NO.: C95209
September 2009

Figure 5.3. Vehicle Certification Label

5.0 PHOTOGRAPHS (4 of 14)

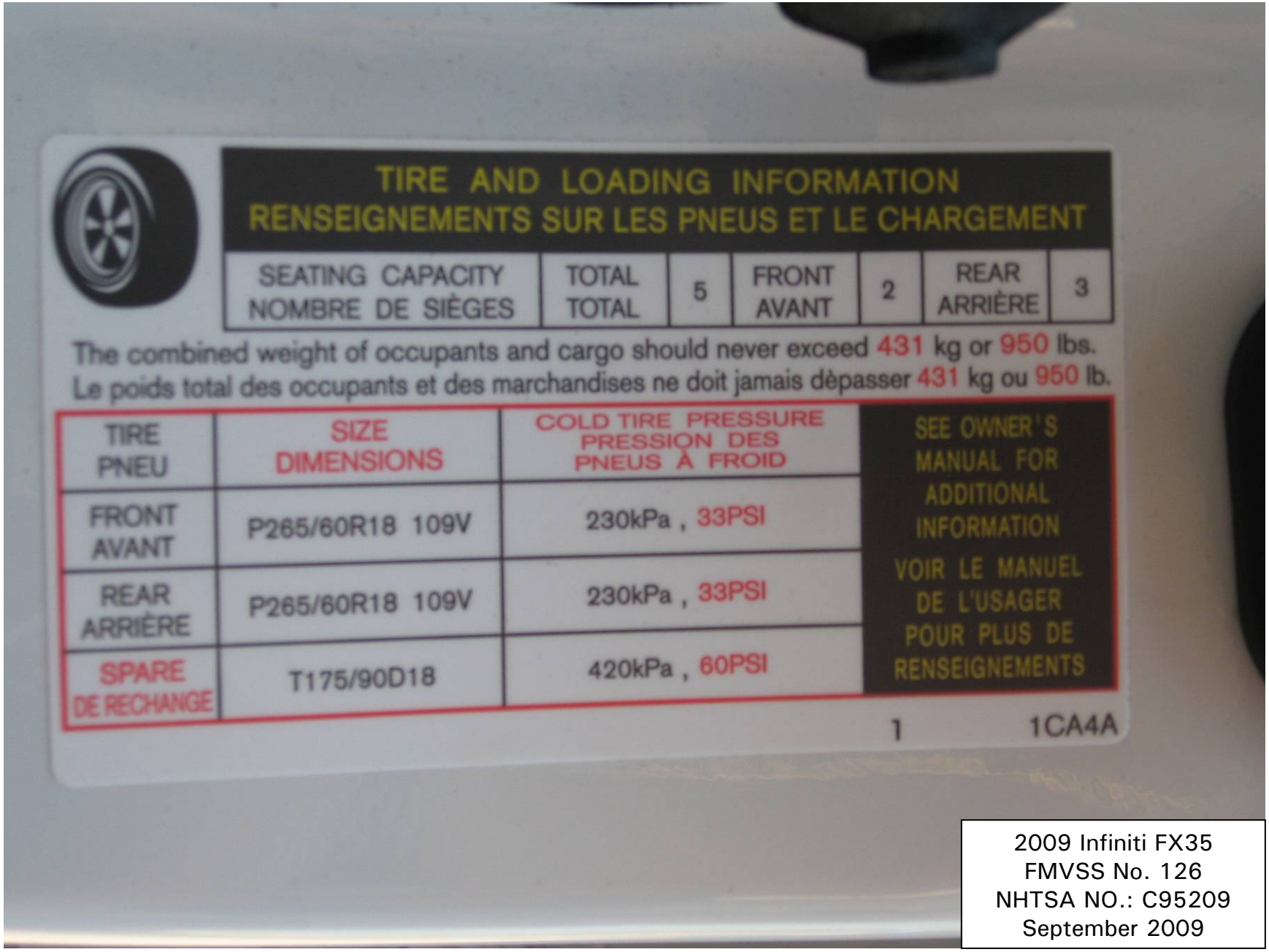


Figure 5.4. Vehicle Placard

5.0 PHOTOGRAPHS (5 of 14)

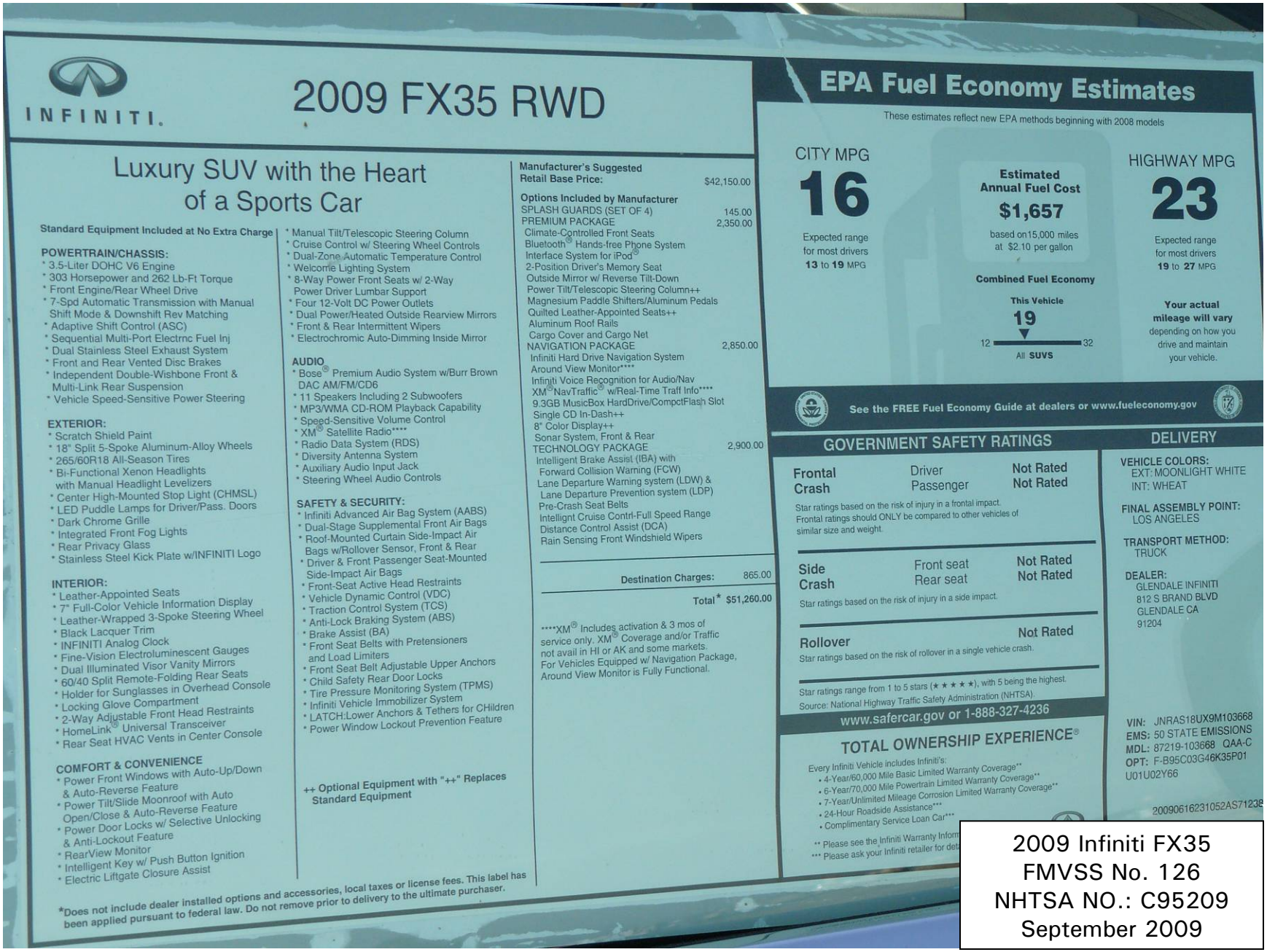


Figure 5.5. Window Sticker (Monroney Label)

5.0 PHOTOGRAPHS (6 of 14)

Figure 5.6. Telltales for VDC Actuation, Malfunction and VDC Off

5.0 PHOTOGRAPHS (7 of 14)

Figure 5.7. VDC Off Control Switch

5.0 PHOTOGRAPHS (8 of 14)

Figure 5.8. Front View of Vehicle As-Tested

5.0 PHOTOGRAPHS (9 of 14)

Figure 5.9. Rear View of Vehicle As-Tested

5.0 PHOTOGRAPHS (10 of 14)

Figure 5.10. Ultrasonic Height Sensor Mounted on Left Side of Vehicle for Determining Body Roll Angle

5.0 PHOTOGRAPHS (11 of 14)

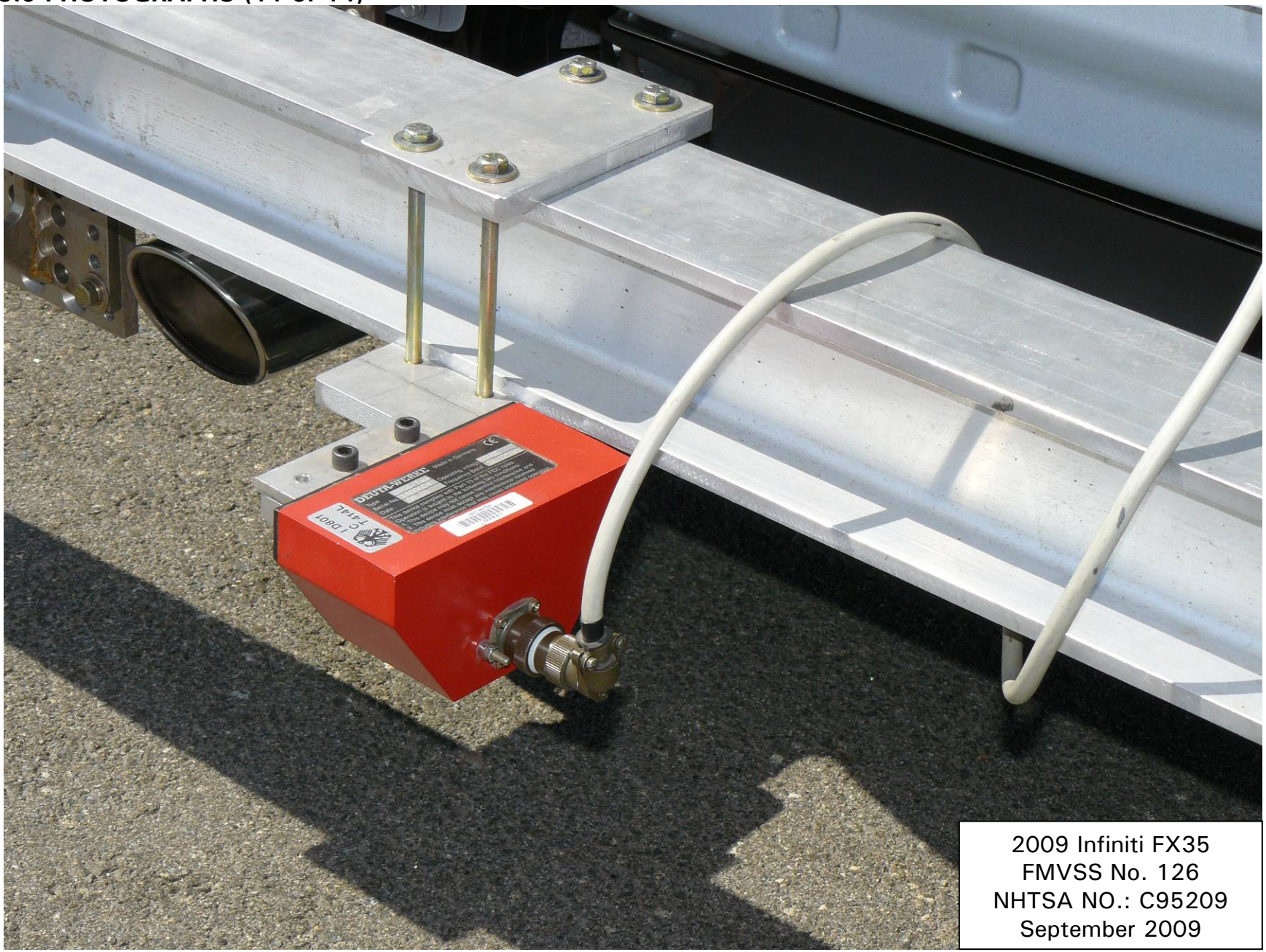


Figure 5.11. Rear Outrigger, Mount and Speed Sensor

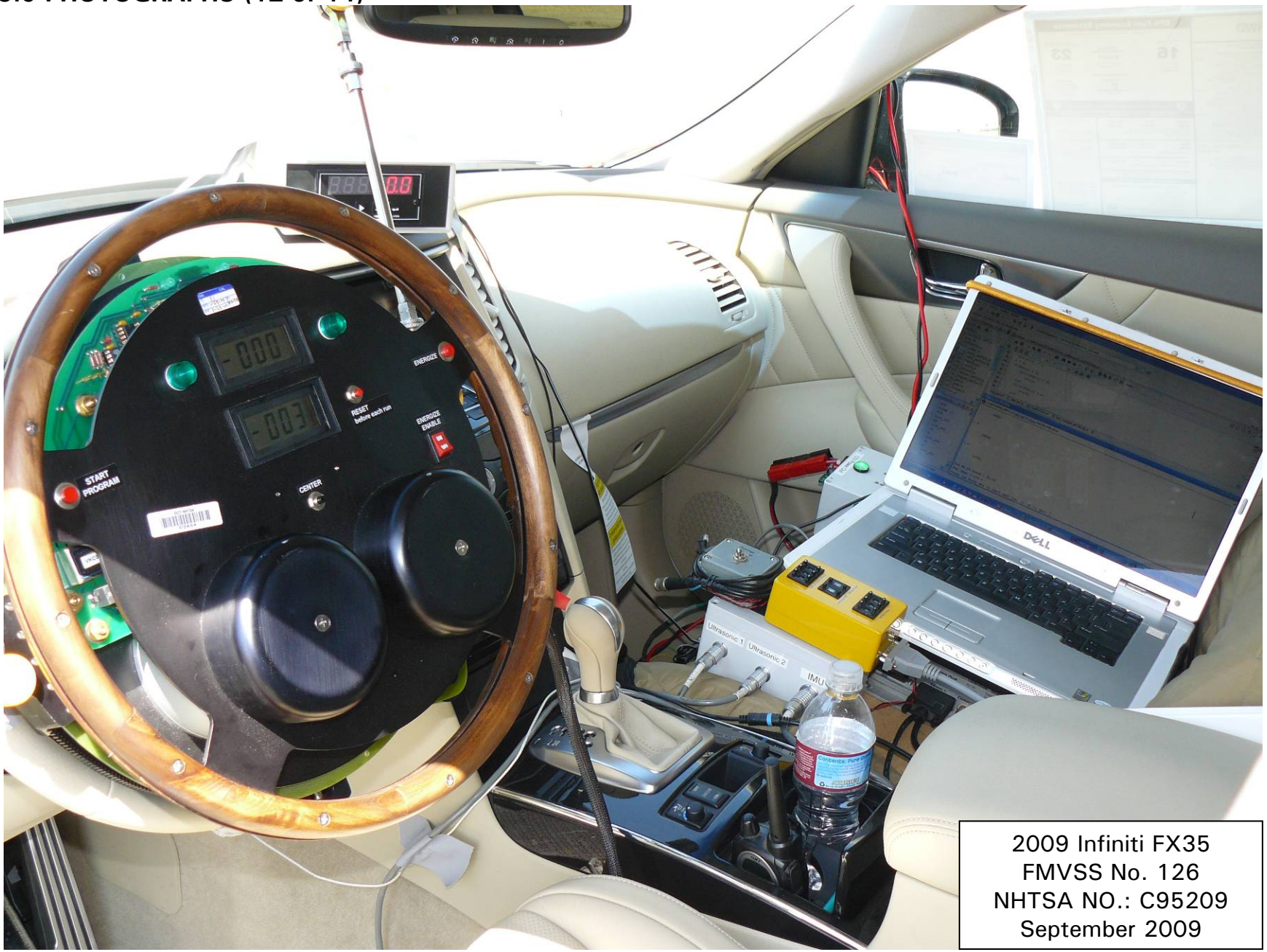


Figure 5.12. Steering Controller and Data Acquisition Computer

5.0 PHOTOGRAPHS (13 of 14)

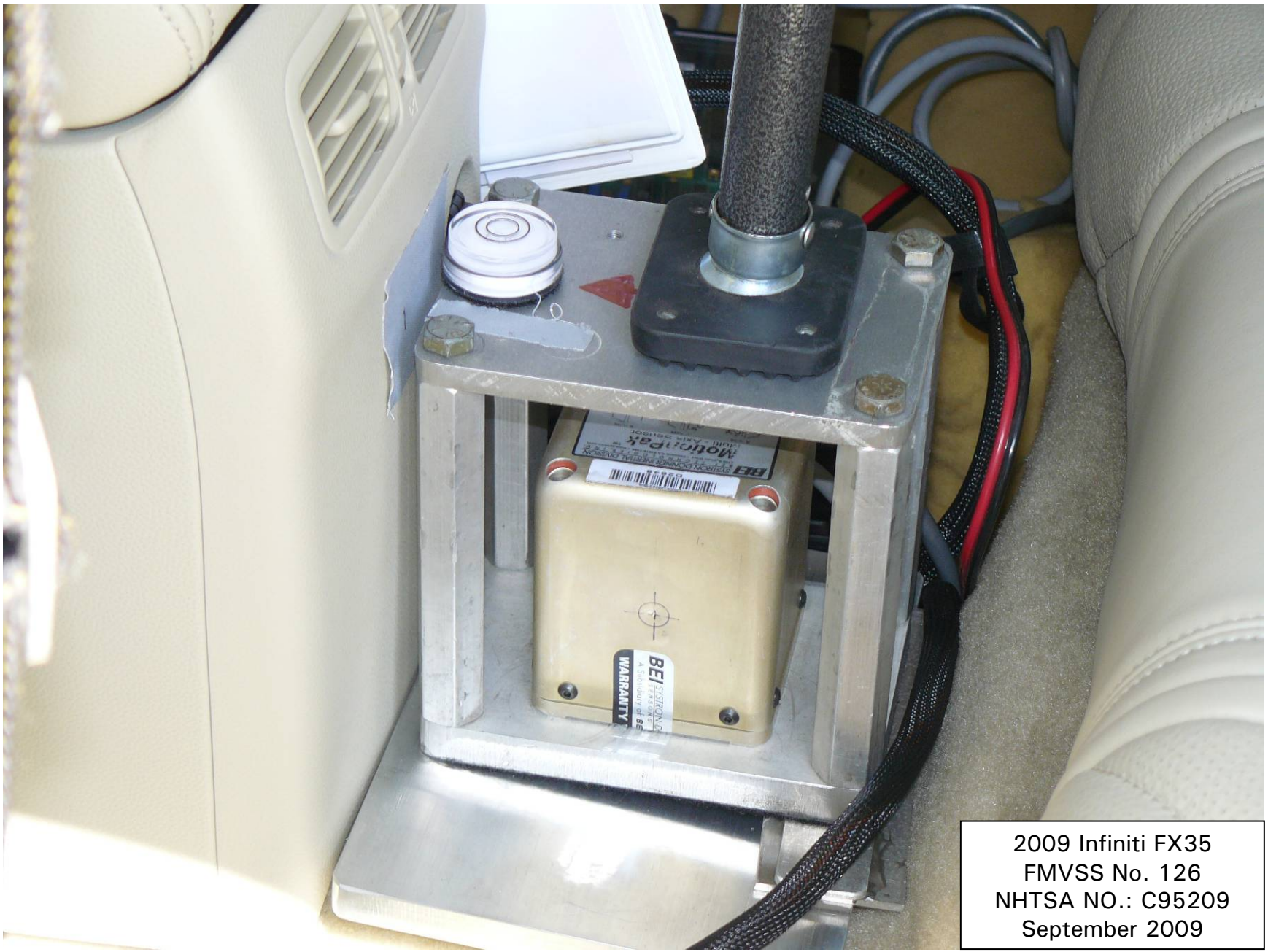


Figure 5.13. Inertial Measurement Unit Mounted in Vehicle

5.0 PHOTOGRAPHS (14 of 14)

Figure 5.14. Brake Pedal Load Cell

6.0 DATA PLOTS (1 of 4)

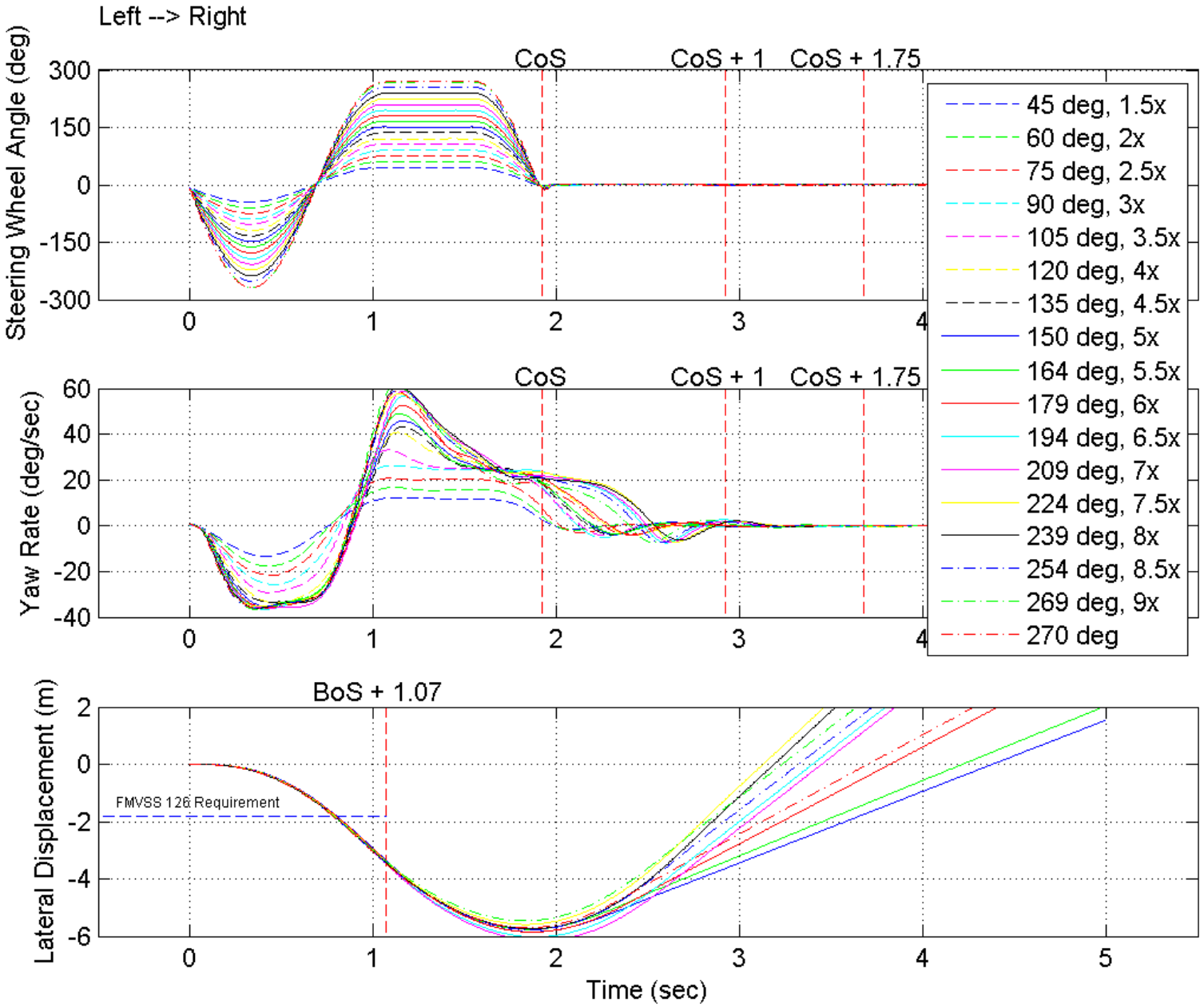


Figure 6.1. Steering Wheel Angle, Yaw Rate and Lateral Displacement for L-R Series

6.0 DATA PLOTS (2 of 4)

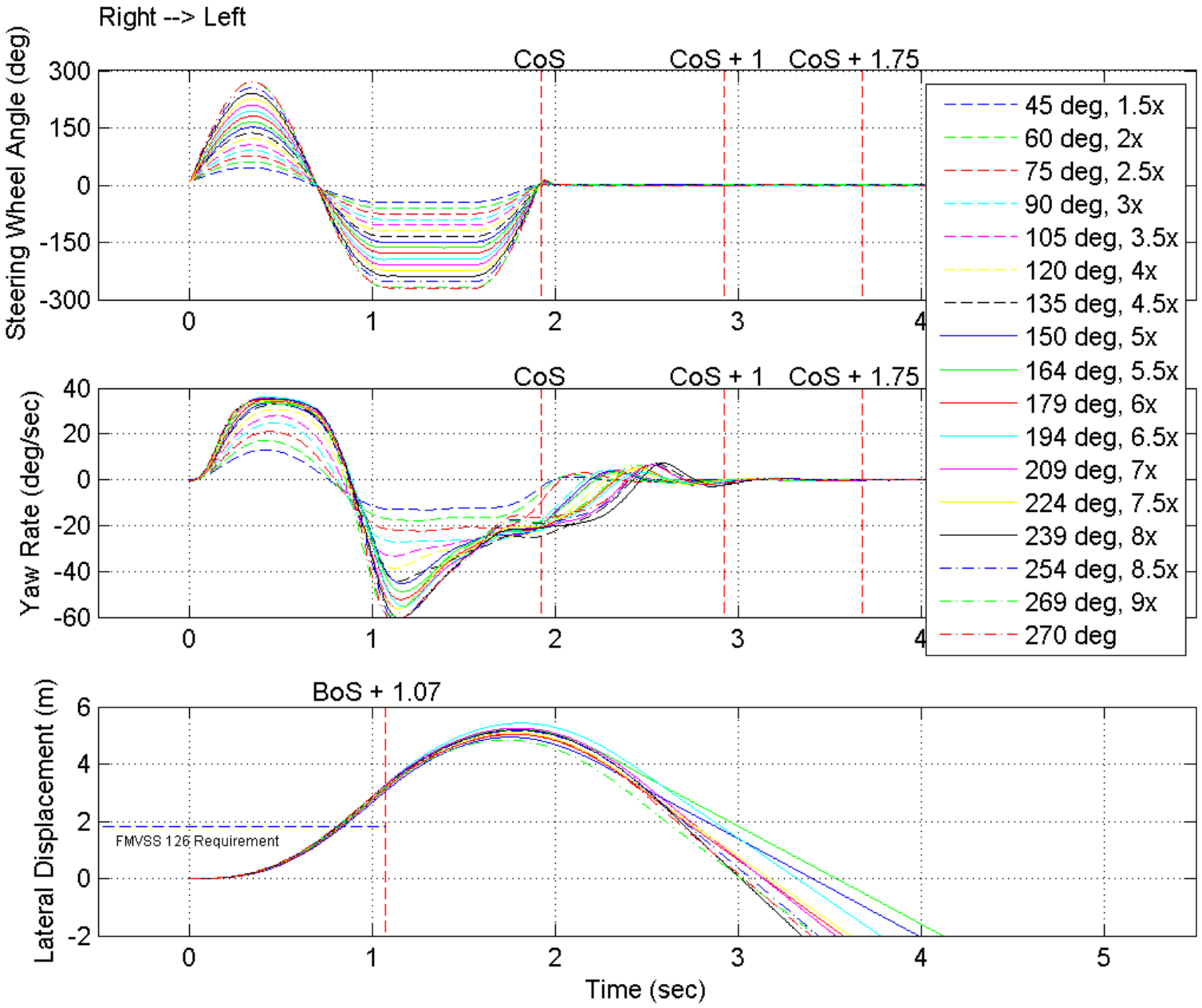


Figure 6.2. Steering Wheel Angle, Yaw Rate and Lateral Displacement for R-L Series

6.0 DATA PLOTS (3 of 4)

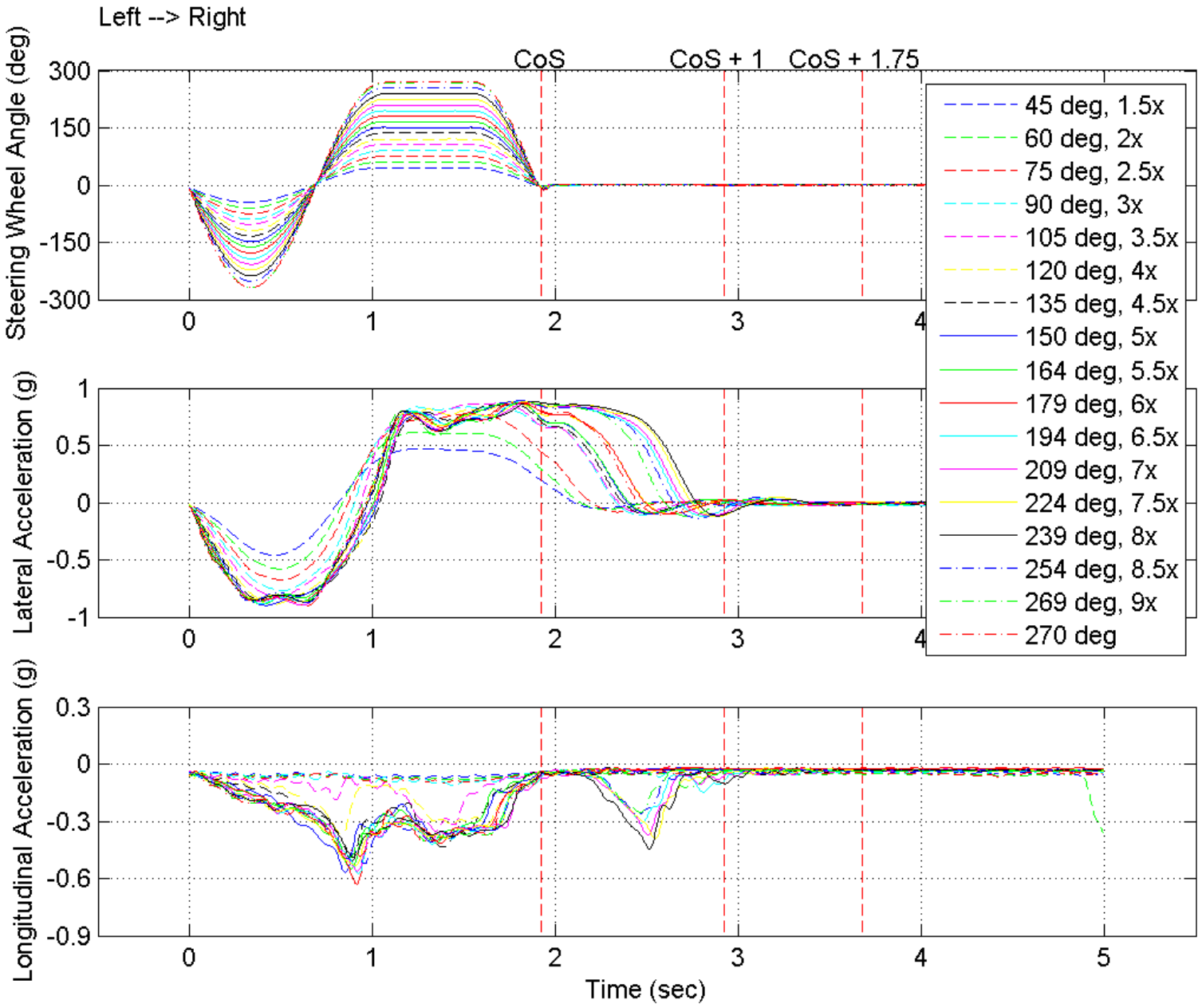


Figure 6.3. Steering Wheel Angle, Lateral Acceleration and Longitudinal Acceleration for L-R Series

6.0 DATA PLOTS (4 of 4)

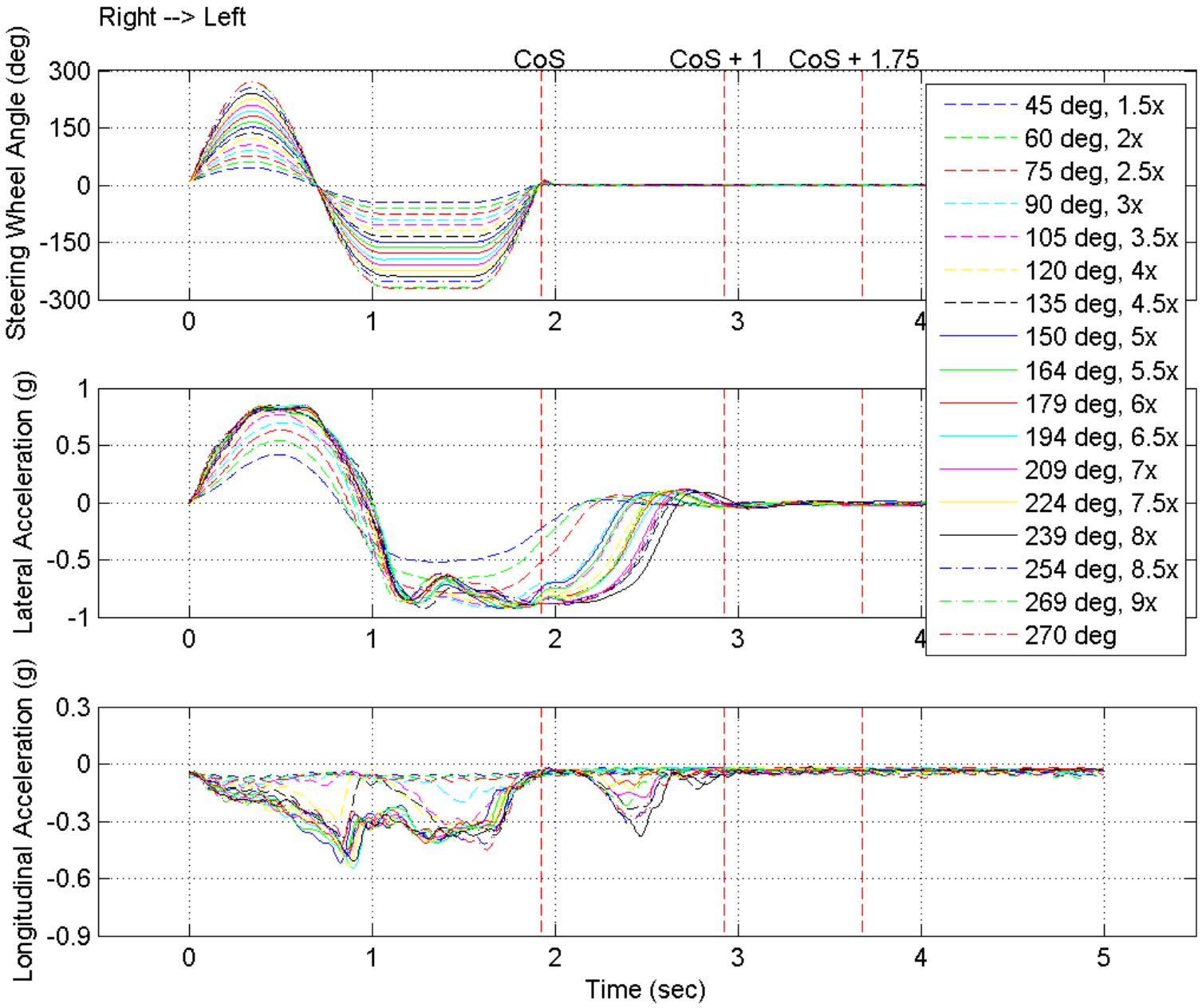


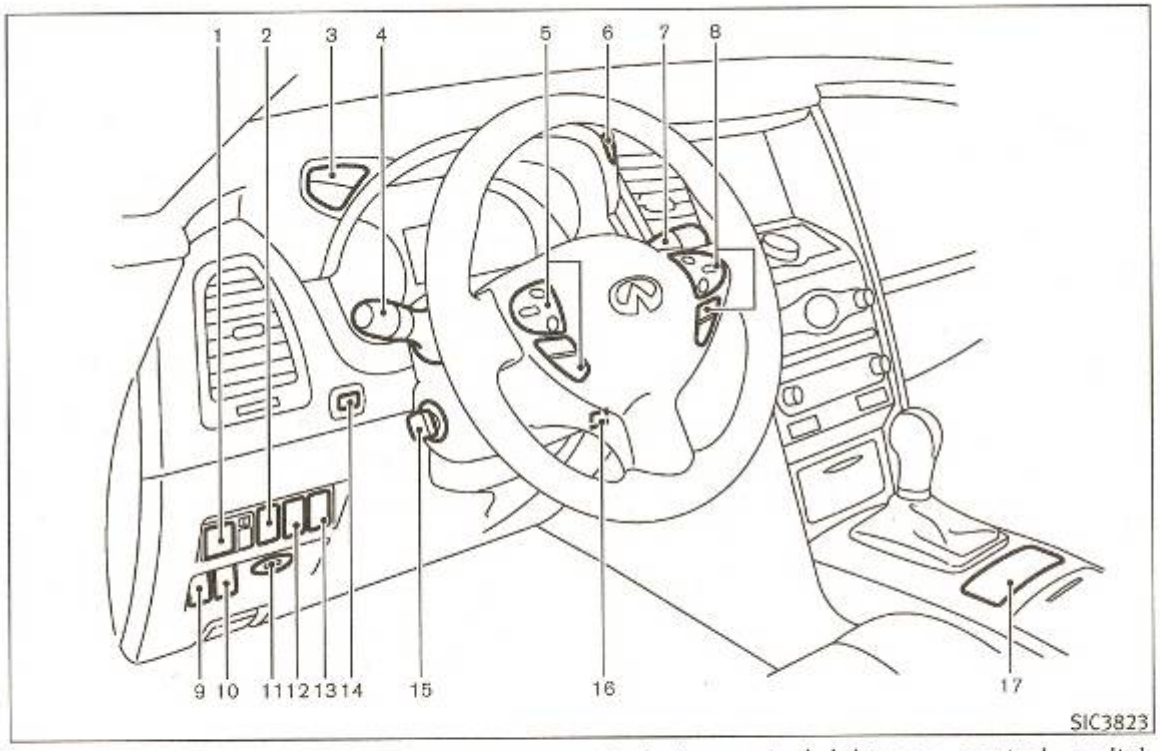
Figure 6.4. Steering Wheel Angle, Lateral Acceleration and Longitudinal Acceleration for R-L Series

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. Outside mirror remote control switch (P. 3-22)
2. Adaptive Front lighting System (AFS) switch (if so equipped) (P. 2-39)/ Headlight aiming control switch (P. 2-38)
3. Instrument brightness control switch (P. 2-40)
4. Headlight, fog light and turn signal switch (P. 2-36)
5. Steering-wheel-mounted controls (left side)
   — ENTER or tuning switch (P. 4-65)
   — BACK switch (P. 4-65)
   — TALK switch (if so equipped) (P. 4-105)/Phone switch (if so equipped) (P. 4-81)
   — Volume control switches (P. 4-65)
   — Source select switch (P. 4-65)
6. Trip computer switch (P. 2-27)
7. Windshield wiper and washer switch (P. 2-33)
8. Steering-wheel-mounted controls (right side)
   — Cruise control switches (P. 5-25)
   — Intelligent Cruise Control (ICC) switches (if so equipped) (P. 5-27)
   — Lane Departure Prevention (LDP) switch (if so equipped) (P. 5-18)
9. Intelligent Brake Assist (IBA) off switch (if so equipped) (P. 2-46)
10. Vehicle Dynamic Control (VDC) OFF switch (P. 5-74)
11. Intelligent Key port (P. 5-11)

7.1 OWNER'S MANUAL PAGES (CONTD)

WARNING/INDICATOR LIGHTS AND AUDIBLE REMINDERS

AWD All-Wheel Drive (AWD) warning light (AWD models)*	Lane departure warning light (orange)*	IBA OFF Intelligent Brake Assist (IBA) off indicator light*
ABS Anti-lock Braking System (ABS) warning light	Low tire pressure warning light	Lane Departure Prevention (LDP) ON indicator light (green)*
	Master warning light	SERVICE ENGINE SOON Malfunction Indicator Light (MIL)
AT CHECK Automatic transmission check warning light	CRUISE Preview Function warning light (orange)*	Security indicator light
BRAKE Brake warning light	RAS Rear Active Steer warning light*	Slip indicator light
	Seat belt warning light	Small light indicator lights
Charge warning light	Supplemental air bag warning light	SPORT SPORT mode indicator light*
CRUISE Distance Control Assist (DCA) system warning light (orange)*	AFS OFF Adaptive Front lighting System (AFS) indicator light*	Turn signal/hazard indicator lights
Engine oil pressure warning light	P/*1 Automatic transmission position indicator light	VDC OFF Vehicle Dynamic Control (VDC) off indicator light
CRUISE Intelligent Cruise Control (ICC) system warning light (orange)*	Front passenger air bag status light	*: if so equipped
KEY Intelligent Key warning light	High beam indicator light (blue)	

2-12 **Instruments and controls**

- Malfunction indicator light blinking — An engine misfire has been detected which may damage the emission control system.

  To reduce or avoid emission control system damage:

  a) Do not drive at speeds above 45 MPH (72 km/h).

  b) Avoid hard acceleration or deceleration.

  c) Avoid steep uphill grades.

  d) 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 dealer. You do not need to have your vehicle towed to the dealer.

⚠ 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.

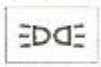
Security indicator light

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.

Slip indicator light

This indicator will blink when the VDC system is operating, thus alerting the driver to the fact that the road surface is slippery and the vehicle is nearing its traction limits.



Small light indicator light

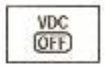
The light illuminates when the front park, side marker, tail and license plate lights are on.

SPORT mode indicator light (if so equipped)

The SPORT mode indicator light illuminates when the SPORT mode is turned "ON". (See "CONTINUOUS DAMPING CONTROL" in the "5. Starting and driving" section.)

Turn signal/hazard indicator lights

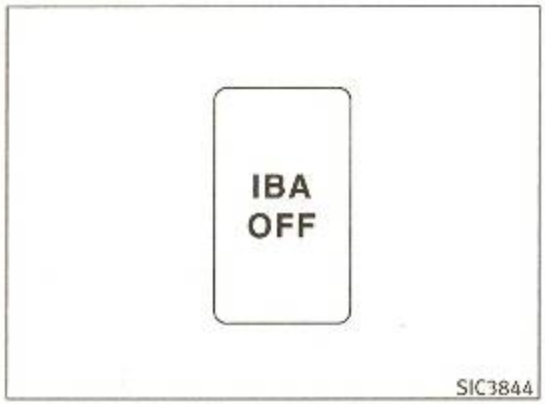
The light flashes when the turn signal switch lever or hazard switch is turned on.



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 vehicle dynamic control off indicator light and slip indicator light come on with the vehicle dynamic control system 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 system may not be functioning properly. Have the system checked by an INFINITI dealer. If an abnormality 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.

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



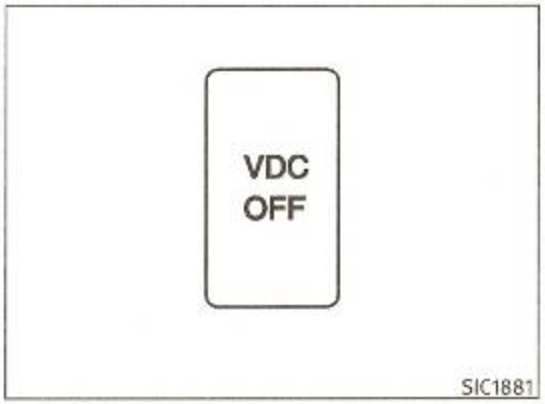
The vehicle should be driven with the Intelligent Brake Assist (IBA) system on for most driving conditions.

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 IBA OFF 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.

VEHICLE DYNAMIC CONTROL (VDC) OFF SWITCH



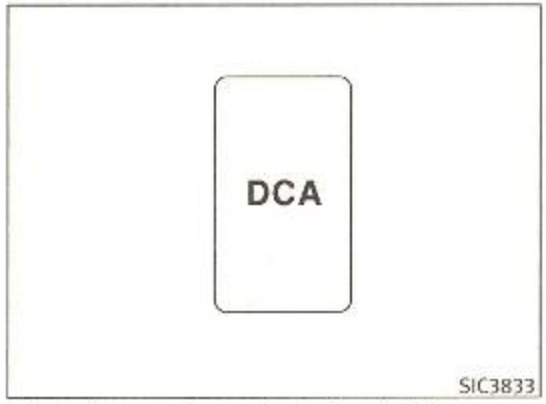
The vehicle should be driven with the Vehicle Dynamic Control (VDC) system on for most driving conditions.

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 VDC OFF indicator will illuminate.

Push the VDC OFF switch again or restart the engine to turn on the system. (See "VEHICLE DYNAMIC CONTROL (VDC) SYSTEM" in the "5. Starting and driving" section.)

DISTANCE CONTROL ASSIST (DCA) SWITCH (if so equipped)



The Distance Control Assist (DCA) system brakes and moves the accelerator pedal upward according to the distance and the relative speed to the vehicle ahead to help assist the driver to maintain a following distance.

To turn on the DCA system, push the DCA switch. The DCA system switch indicator light illuminates on the dot matrix liquid crystal display while the DCA system is on.

To turn off the DCA system, push the DCA switch. The DCA system switch indicator light will turn off.

See "DISTANCE CONTROL ASSIST (DCA) SYSTEM" in the "5. Starting and driving" section for more details.

VEHICLE DYNAMIC CONTROL (VDC) SYSTEM

When accelerating or driving on slippery surfaces, the tires may spin or slide. With the Vehicle Dynamic Control (VDC) system, sensors detect these movements and control the braking and engine output to help improve vehicle stability.

- When the VDC system is operating, the "SLIP" indicator in the instrument panel blinks.
- If the "SLIP" indicator blinks, the road conditions are slippery. Be sure to adjust your speed and driving to these conditions. Be sure to drive carefully. (See "Slip indicator light" in the "2. Instruments and controls" section, and "Vehicle Dynamic Control (VDC) off indicator light" in the "2. Instruments and controls" section.)
- Indicator light

  If a malfunction occurs in the system, the "SLIP" and "VDC OFF" indicator lights illuminate in the instrument panel. As long as these indicators are illuminated, the VDC system function is canceled.

The VDC system uses an Active Brake Limited Slip (ABLS) function to improve vehicle traction. The ABLS system works when one of the driving wheels is spinning on a slippery surface. The ABLS system brakes the spinning wheel, which distributes the driving power to the other drive wheel. If the vehicle is operated with the VDC OFF switch pushed and the VDC system turned off, all VDC systems will be turned off. The ABLS system and ABS will still operate with the VDC system off. If the ABLS system is activated, the "SLIP" indicator will blink and 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.

While the VDC system is operating, you may feel a pulsation in the brake pedal and hear a noise or feel a vibration from under the hood. This is normal and indicates that the VDC system is working properly.

The VDC system computer has a built-in diagnostic feature that tests the system each time you start the engine and move the vehicle at a low speed forward or backward. 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 due to careless or dangerous driving techniques. Reduce vehicle speed and be especially careful when driving and cornering on slippery 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 approved or are extremely deteriorated the VDC system may not operate properly. This could adversely affect vehicle handling performance, and the "VDC OFF" indicator or "SLIP" indicator or both indicator lights may illuminate.**
- **If brake related parts such as brake pads, rotors and calipers are not standard equipment or are extremely deteriorated, the "VDC OFF" indicator or "SLIP" indicator or both indicator lights may illuminate.**
- **If engine related parts such as muffler are not standard equipment or are extremely deteriorated, the "VDC OFF" indicator or "SLIP" indicator or both indicator lights may illuminate.**

- **When driving on extremely inclined surfaces such as higher banked corners, the VDC system may not operate properly and the "VDC OFF" indicator or "SLIP" indicator or both indicator lights may illuminate. Do not drive on these types of roads.**
- **When driving on unstable surfaces such as a turntable, ferry, elevator or ramp, the "VDC OFF" indicator or "SLIP" indicator or both indicator lights may illuminate. This is not a malfunction. Restart the engine after driving onto a stable surface.**
- **If wheels or tires other than those recommended are used, the VDC system may not operate properly and "VDC OFF" indicator or "SLIP" indicator or both indicator lights may illuminate.**
- **The VDC system is not a substitute for winter tires or tire chains on a snow covered road.**

REAR ACTIVE STEER SYSTEM (if so equipped)

The Rear Active Steer system is an electronically controlled four-wheel steering system.

The angle of the rear wheels are adjusted by the Rear Active Steer system, depending on the vehicle speed and steering angle. The rear wheels are designed to turn momentarily in the opposite direction and then change to the same direction as the front wheels.

At low speeds, the rear wheels will not turn and the system functions as a two-wheel steering system.

If a malfunction occurs in the system, the Rear Active Steer function will stop but the ordinary two-wheel steering system will operate normally. The "RAS" warning light will illuminate. If the light illuminates while driving, contact an INFINITI dealer for repair.

⚠ WARNING

The Rear Active Steer system, although a sophisticated device, cannot prevent accidents resulting from careless or dangerous driving techniques. Ultimately the responsibility for safety of self and others rests in the hands of the driver. Therefore only through attentive and careful driving methods can the Rear Active Steer system be fully appreciated and safety assured.

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.

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.

Securely install the vehicle recovery hook ① stored with jacking tools as illustrated. Attach the tow strap to the recovery hook. Make sure that the hook is properly secured in the original place after use.

Do not use the tie down hooks ② for towing or vehicle recovery.

⚠ CAUTION

- **Tow chains or cables must be attached only to the vehicle recovery hooks or main structural members of the vehicle. Otherwise, the vehicle body will be damaged.**
- **Do not use the vehicle tie downs to free a vehicle stuck in sand, snow, mud, etc.**
- **Never tow a vehicle using the vehicle tie downs or recovery hooks.**
- **Always pull the cable straight out from the front of the vehicle. Never pull on the vehicle at an angle.**
- **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.
   - Shift back and forth between R (reverse) and D (drive).
   - Apply the accelerator as little as possible to maintain the rocking motion.
   - Release the accelerator pedal before shifting between R and D.
   - Do not spin the tires above 35 MPH (55 km/h).
5. If the vehicle cannot be freed after a few tries, contact a professional towing service to remove the vehicle.

CHECKING BULBS

With all doors closed, apply the parking brake and push the ignition switch to the ON position without starting the engine. The following lights will come on (if so equipped):

, BRAKE or , , SERVICE ENGINE SOON , , AWD , CRUISE

The following lights come on briefly and then go off (if so equipped):

, ABS or , A T CHECK , , VDC OFF , , KEY , , AFS OFF , IBA OFF

If any light does not come on, it may indicate a burned-out bulb or an open circuit in the electrical system. Have the system checked by an INFINITI dealer.

Some indicators and warnings are also displayed on the dot matrix crystal display between the speedometer and tachometer. (See "DOT MATRIX LIQUID CRYSTAL DISPLAY" later in this section.)

WARNING LIGHTS

AWD All-Wheel Drive (AWD) warning light (AWD models)

The **AWD** warning light comes on when the ignition switch is pushed to ON. It turns off soon after the engine is started.

If the AWD system malfunctions, or the diameter of the front and the rear wheels are different, the warning light will either remain illuminated or blink. (See "ALL-WHEEL DRIVE (AWD)" in the "5. Starting and driving" section.)

⚠ CAUTION

- **If the warning light comes on while driving there may be a malfunction in the AWD system. Reduce the vehicle speed and have your vehicle checked by an INFINITI dealer as soon as possible.**
- **If the AWD warning light blinks on when you are driving:**
  - **blinks rapidly (about twice a second):**

    Pull off the road in a safe area, and idle the engine. The driving mode will change to 2WD to prevent the AWD system from malfunctioning. If the warning light turns off, you can drive again.
  - **blinks slowly (about once every 2 seconds):**

    Pull off the road in a safe area, and idle the engine. Check that all tire sizes are the same, tire pressure is correct and tires are not worn.
- **If the warning light is still on after the above operations, have your vehicle checked by an INFINITI dealer as soon as possible.**

ABS or (ABS) Anti-lock Braking System (ABS) warning light

When the ignition switch is in the ON position, the Anti-lock Braking System (ABS) warning light illuminates and then turns off. This indicates the ABS is operational.

If the ABS warning light illuminates while the engine is running, or while driving, it may indicate the ABS is not functioning properly. Have the system checked by an INFINITI dealer.

If an ABS malfunction occurs, the anti-lock function is turned off. The brake system then operates normally, but without anti-lock assistance. (See "BRAKE SYSTEM" in the "5. Starting and driving" section.)

AT CHECK

Automatic transmission check warning light

When the ignition switch is pushed to the ON position, the light comes on for 2 seconds. If the light comes on at any other time, it may indicate the transmission is not functioning properly. Have your INFINITI dealer check and repair the transmission.

BRAKE or 

Brake warning light

This light functions for both the parking brake and the foot brake systems.

Parking brake indicator :

When the ignition switch is in the ON position, the light comes on when the parking brake is applied.

Low brake fluid warning light :

When the ignition switch is in the ON position, the light warns of a low brake fluid level. If the light comes on while the engine is running with the parking brake not applied, stop the vehicle and perform the following:

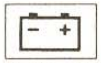
1. Check the brake fluid level. Add brake fluid as necessary. (See "BRAKE FLUID" in the "8. Maintenance and do-it-yourself" section.)
2. If the brake fluid level is correct, have the warning system checked by an INFINITI dealer.

Anti-lock Braking System (ABS) warning indicator :

When the parking brake is released and the brake fluid level is sufficient, if both the brake warning light and the Anti-lock Braking System (ABS) warning light illuminate, it may indicate the ABS is not functioning properly. Have the brake system checked, and if necessary repaired, by an INFINITI dealer promptly. (See "Anti-lock Braking System (ABS) warning light" earlier in this section.)

⚠ WARNING

- **Your brake system may not be working properly if the warning light is on. Driving could be dangerous. If you judge it to be safe, drive carefully to the nearest service station for repairs. Otherwise, have your vehicle towed because driving it could be dangerous.**
- **Pressing the brake pedal with the engine stopped and/or low brake fluid level may increase your stopping distance and braking will require greater pedal effort as well as pedal travel.**
- **If the brake fluid level is below the minimum or MIN mark on the brake fluid reservoir, do not drive until the brake system has been checked at an INFINITI dealer.**



Charge warning light

If the light comes on while the engine is running, it may indicate the charging system is not functioning properly. Turn the engine off and check the alternator belt. If the belt is loose, broken, missing or if the light remains on, see an INFINITI dealer immediately.

⚠ CAUTION

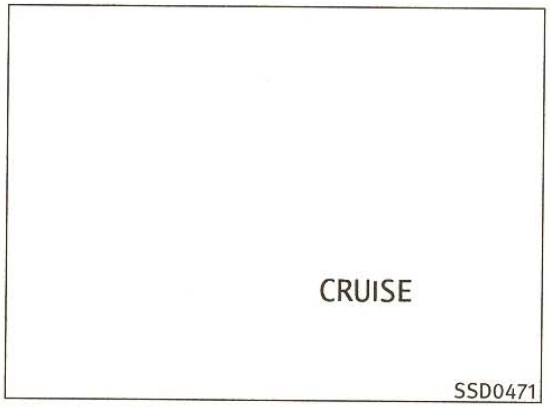
Do not continue driving if the alternator belt is loose, broken or missing.

CRUISE

Distance Control Assist (DCA) system warning light (orange; if so equipped)

This light comes on if there is a malfunction in the Distance Control Assist (DCA) system.

If the warning light illuminates, park the vehicle in a safe place. Turn the engine off, restart the engine, resume driving and turn on the DCA system again.



Warning light and display

When the Preview Function is not operating properly, the buzzer sounds and the system warning light (orange) will come on.

Action to take :

If the warning light comes on, park the vehicle in a safe place. Turn the engine off, restart the engine and resume driving.

If the indicator stays on, it may indicate that the Preview Function is malfunctioning (the brake is operative). Although the Vehicle is still driveable under normal conditions, have the vehicle checked at an INFINITI dealer.

How to handle the sensor

The sensor for the Preview Function is common with Intelligent Cruise Control and is located below the front bumper.

To keep the Preview Function operating properly, be sure to observe the following:

- Always keep the sensor clean. Wipe with a soft cloth carefully so as not to damage the sensor.
- Do not strike or damage the areas around the sensor. Do not touch or remove the screw located on the sensor. Doing so could cause failure or malfunction. If the sensor is damaged due to an accident, contact an INFINITI dealer.
- Do not attach a sticker (including transparent material) or install an accessory near the sensor. This could cause failure or malfunction.

ANTI-LOCK BRAKING SYSTEM (ABS)

⚠ WARNING

- **The Anti-lock Braking System (ABS) is a sophisticated device, but it cannot prevent accidents resulting from careless or dangerous driving techniques. It can help maintain vehicle control during braking on slippery surfaces. Remember that stopping distances on slippery surfaces will be longer than on normal surfaces even with ABS. Stopping distances may also be longer on rough, gravel or snow covered roads, or if you are using tire chains. Always maintain a safe distance from the vehicle in front of you. Ultimately, the driver is responsible for safety.**
- **Tire type and condition may also affect braking effectiveness.**
  - **When replacing tires, install the specified size of tires on all four wheels.**
  - **When installing a spare tire, make sure that it is the proper size and type as specified on the Tire and Loading Information label. See "TIRE AND LOADING INFORMATION LABEL" in the "9. Technical and consumer information" section of this manual.**

– For detailed information, see "WHEELS AND TIRES" in the "8. Maintenance and do-it-yourself" section of this manual.

The Anti-lock Braking System (ABS) controls the brakes so the wheels do not lock during hard braking or when braking on slippery surfaces. The system detects the rotation speed at each wheel and varies the brake fluid pressure to prevent each wheel from locking and sliding. By preventing each wheel from locking, the system helps the driver maintain steering control and helps to minimize swerving and spinning on slippery surfaces.

Using the system

Depress the brake pedal and hold it down. Depress the brake pedal with firm steady pressure, but do not pump the brakes. The ABS will operate to prevent the wheels from locking up. Steer the vehicle to avoid obstacles.

⚠ WARNING

Do not pump the brake pedal. Doing so may result in increased stopping distances.

Self-test feature

The ABS includes electronic sensors, electric pumps, hydraulic solenoids and a computer. The computer has a built-in diagnostic feature that tests the system each time you start the engine and move the vehicle at a low speed in forward or reverse. When the self-test occurs, you may hear a "clunk" noise and/or feel a pulsation in the brake pedal. This is normal and does not indicate a malfunction. If the computer senses a malfunction, it switches the ABS off and illuminates the ABS warning light on the instrument panel. The brake system then operates normally, but without anti-lock assistance.

If the ABS warning light illuminates during the self-test or while driving, have the vehicle checked by an INFINITI dealer.

Normal operation

The ABS operates at speeds above 3 to 6 MPH (5 to 10 km/h). The speed varies according to road conditions.

When the ABS senses that one or more wheels are close to locking up, the actuator rapidly applies and releases hydraulic pressure. This action is similar to pumping the brakes very quickly. You may feel a pulsation in the brake pedal and hear a noise from under the hood or feel a vibration from the actuator when it is operating. This is normal and indicates that the ABS is operating properly. However, the pulsation may indicate that road conditions are hazardous and extra care is required while driving.

7.2 VEHICLE ARRIVAL CONDITION REPORT

CONTRACT NO.: DTNH22-08-D-00098
DATE RECIEVED: 9/1/2009

From: *Cerritos Infiniti*

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

To: *Dynamic Research, Inc*

Vehicle VIN: *JNRAS18UX9M103668* NHTSA NO.: *C95209*

Model Year: *2009* Odometer Reading: *57 Miles*
Make: *Infiniti* Body Style: *MPV*
Model: *FX35* Body Color: *White*
Manufacture Date: *6/09* Dealer: *Cerritos Infiniti*
GVWR (kg/lb) *2405 (5301)* 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 Brubacher* DATE RECORDED: *8/31/2009*

APPROVED BY: *J Lenkeit* DATE APPROVED: *10/1/2009*

7.3 VEHICLE COMPLETION CONDITION REPORT

CONTRACT NO.: DTNH22-08-D-00098
DATE RELEASED: 10/7/2009

Vehicle VIN: *JNRAS18UX9M103668* NHTSA NO.: *C95209*

Model Year: *2009* Odometer Reading: *99 Miles*
Make: *Infiniti* Body Style: *MPV*
Model: *FX35* Body Color: *White*
Manufacture Date: *6/09* Dealer: *Cerritos Infiniti*
GVWR (kg/lb) *2404 (5301)* Price: *Leased*

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

X THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS

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

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

X PROPER FUEL FILLER CAP IS SUPPLIED ON THE TEST VEHICLE.

REMARKS:

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

None

Explanation for equipment removal:

None

Test Vehicle Condition:

Good

RECORDED BY: *J. Brubacher* DATE RECORDED: *10/7/2009*

APPROVED BY: *J. Lenkeit* DATE APPROVED: *10/7/2009*

7.4 SINE WITH DWELL TEST RESULTS

2009 Infiniti FX35
NHTSA No. C95209
Date of Test 9/16/2009
Date Created 9/30/2009

File	SWA @ 5deg Ct	MES	Time @ 5deg	COS	Time @ COS	MOS	Time @ MOS	YRR1	YR1	YRR1 Ct	YRR175	YR175	YRR175 Ct	2nd Yaw Peak	2nd Yaw Peak Ct	Lat Disp	Lat. Acc. 1.07s	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	50.2	3.544	1091	5.446	847	4.227	-1.4	-0.18	1291	-1.16	-0.15	1441	12.52	937	-4.2	0.41	45.04	776	44.84
22	709	50.07	3.537	1091	5.446	847	4.226	-0.73	-0.12	1291	-0.84	-0.14	1441	16.9	933	-5.57	0.52	59.93	775	59.79
23	708	50.34	3.533	1090	5.445	846	4.225	-2.36	-0.49	1290	-1.22	-0.25	1440	20.87	928	-6.87	0.59	74.78	775	74.79
24	707	49.98	3.53	1090	5.444	846	4.225	-2.41	-0.64	1290	-1.2	-0.32	1440	26.46	930	-7.97	0.61	89.65	775	89.79
25	707	50.28	3.528	1090	5.444	846	4.225	-1.13	-0.37	1290	-0.65	-0.22	1440	33.06	926	-9.15	0.6	104.69	775	104.79
26	707	50.38	3.526	1090	5.443	846	4.224	0.71	0.29	1290	-0.42	-0.17	1440	41.03	935	-10.06	0.3	119.88	775	119.88
27	706	50.34	3.525	1090	5.443	846	4.224	-0.85	-0.37	1290	-0.18	-0.08	1440	43.24	941	-10.4	0.12	134.95	775	134.8
28	706	50.04	3.524	1090	5.443	846	4.225	-0.43	-0.2	1290	-0.36	-0.17	1440	45.76	941	-10.75	0.19	149.92	775	149.81
29	706	50.14	3.524	1090	5.443	846	4.225	-0.62	-0.3	1290	-0.29	-0.14	1440	48.84	937	-10.82	0.29	163.98	775	163.72
30	706	50.12	3.524	1090	5.443	846	4.225	0.39	0.2	1290	-0.06	-0.03	1440	52.7	941	-10.81	0.21	178.94	775	178.71
31	706	50.56	3.524	1090	5.443	847	4.226	5.13	2.91	1290	-0.26	-0.15	1440	56.58	942	-11.05	0.18	193.86	775	193.62
32	706	50.36	3.524	1090	5.442	847	4.226	2.93	1.72	1290	-0.29	-0.17	1440	58.72	941	-11.13	0.17	208.8	776	208.67
33	706	50.28	3.524	1090	5.443	847	4.226	1.46	0.84	1290	-0.14	-0.08	1440	57.43	937	-10.89	0.43	224.08	776	223.75
34	706	50.41	3.524	1090	5.443	847	4.226	1.47	0.89	1290	-0.51	-0.31	1440	60.58	936	-11.02	0.39	238.84	775	238.77
35	706	50.27	3.524	1090	5.442	847	4.226	2.81	1.67	1290	-0.29	-0.17	1440	59.59	937	-11.08	0.41	254.02	776	253.77
36	706	50.22	3.525	1090	5.443	847	4.227	2.31	1.41	1290	-0.6	-0.37	1440	61.03	933	-10.88	0.48	268.99	775	268.6
37	706	50.29	3.524	1090	5.442	847	4.226	-0.2	-0.12	1290	-0.3	-0.18	1440	58.59	934	-11.13	0.43	269.96	775	269.63
38	710	50.38	3.543	1091	5.447	847	4.228	1.8	-0.24	1291	1.75	-0.23	1441	-13.09	937	4.07	-0.4	45.56	775	45.52
39	709	50.52	3.536	1090	5.444	847	4.226	0.15	-0.03	1290	0.39	-0.07	1440	-17.86	956	5.4	-0.51	60.44	775	60.49
40	708	50.33	3.533	1090	5.444	847	4.227	0.25	-0.06	1290	1.33	-0.3	1440	-22.65	961	6.38	-0.59	75.47	776	75.42
41	707	50.16	3.529	1090	5.443	847	4.226	0.13	-0.04	1290	-0.08	0.02	1440	-27.33	938	7.58	-0.61	90.29	776	90.37
42	707	50.09	3.527	1090	5.443	847	4.226	0.55	-0.18	1290	0.34	-0.11	1440	-33.37	931	8.54	-0.62	105.31	775	105.36
43	706	50.3	3.525	1090	5.443	846	4.225	1.02	-0.4	1290	-0.13	0.05	1440	-38.78	931	9.32	-0.56	120.51	775	120.55
44	706	50.3	3.523	1090	5.443	846	4.225	5.34	-2.37	1290	0.2	-0.09	1440	-44.38	936	9.86	-0.38	135.52	775	135.52
45	706	50.15	3.523	1090	5.442	846	4.225	-0.55	0.25	1290	-0.38	0.17	1440	-45.32	939	9.93	-0.38	150.61	775	150.48
46	706	50.26	3.523	1090	5.443	847	4.226	-0.11	0.05	1290	-0.29	0.14	1440	-48.69	940	10.26	-0.32	164.53	775	164.46
47	706	50.08	3.522	1090	5.442	846	4.225	0.65	-0.34	1290	-0.15	0.08	1440	-52.36	937	10.2	-0.43	179.72	775	179.35
48	706	50.13	3.522	1090	5.442	846	4.225	1.32	-0.73	1290	0.17	-0.1	1440	-55.18	940	10.56	-0.29	194.5	775	194.24
49	706	50.24	3.522	1090	5.442	847	4.226	2.21	-1.24	1290	0.26	-0.15	1440	-56.14	935	10.56	-0.46	209.5	775	209.16
50	706	50.35	3.522	1090	5.441	847	4.226	0.3	-0.17	1290	-0.27	0.15	1440	-56.35	934	10.54	-0.53	224.84	775	224.16
51	706	50.23	3.522	1090	5.442	847	4.226	4.03	-2.44	1290	0.17	-0.1	1440	-60.61	937	10.45	-0.42	239.71	775	239.18
52	706	50.27	3.523	1090	5.443	847	4.226	2.59	-1.59	1290	-0.04	0.02	1440	-61.33	934	10.48	-0.45	254.61	775	254.14
53	706	50.28	3.523	1090	5.442	847	4.226	0.56	-0.33	1290	-0.05	0.03	1440	-59.42	928	10.41	-0.65	269.7	776	269.08
54	706	50.21	3.523	1090	5.442	847	4.226	2.48	-1.53	1290	0.26	-0.16	1440	-61.86	932	10.47	-0.54	270.53	775	270.15

7.5 SLOWLY INCREASING STEER TEST RESULTS

2009 Infiniti FX35
NHTSA No. 95209
Date of Test 9/16/2009
Date Created 9/30/2009

File	EventPt	DOS	MES (mph)	Mean SPD (mph)	AYcount_3	THETAENCF_3 (deg)	AYCG_CD2_3 (g)	r_squared	ZeroBegin	ZeroEnd
10	704	1	49.24	49.34	1150	-30.12	-0.3033	0.9962	504	704
11	700	1	50.07	49.91	1154	-30.19	-0.3011	0.9951	500	700
12	699	1	49.92	50.04	1147	-29.77	-0.3088	0.9959	499	699
13	706	0	49.63	49.75	1150	30.09	0.2954	0.9976	506	706
14	706	0	49.63	50.36	1145	29.78	0.3004	0.9973	506	706
15	705	0	50.12	50.15	1142	29.61	0.3009	0.9971	505	705
Averages						29.9	0.3016			

Scalars	Steering Angles (deg)
1.5	45
2	60
2.5	75
3	90
3.5	105
4	120
4.5	135
5	150
5.5	164
6	179
6.5	194
7	209
7.5	224
8	239
8.5	254
9	269
9	270

7.6 INERTIAL SENSING SYSTEM LOCATION COORDINATES

Vehicle:	**2009 Infiniti FX35**		
NHTSA No.:	C95209		
Measurement date:	9/08/2009		
Wheelbase:	113.6	Faro Arm S/N:	U02-05-08-06636
Units	Inches	Certification date:	8/18/2009

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	Rex Y	Ref Z
M_PLANE001_Ground_Plane	-	-	0.000
M_Line_Y_Axis	2.390	-4.196	0.000
M_Point_48_Ref	0.000	0.000	-
M_CIRCLE001_I_Left_Rear_Wheel_Axle	-20.812	12.342	-14.468
M_Point_IMU_side	16.591	46.615	-23.0466
M_Point_ROOF	-	-	-64.215
Motion Pak reference point taken from mid height of unit left side			
Motion Pak Width = 3.05" ==> ½ W = 1.525			
Motion_PAK_Location	16.591	48.150	-23.0466

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 origin.
   - 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	Rex Y	Ref Z
Motion_PAK_Location in S7D (Matlab program) coordinate system	**76.197**	**0.150**	**23.047**

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).