REPORT NUMBER 138-STF-09-006

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 138 TIRE PRESSURE MONITORING SYSTEMS

NISSAN MOTOR COMPANY, LTD.
2009 NISSAN ROGUE
FOUR-DOOR MPV
NHTSA NO. C95205

U.S. DOT SAN ANGELO TEST FACILITY
131 COMANCHE TRAIL, BUILDING 3527
GOODFELLOW AFB, TEXAS 76908

April 30, 2009

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
NVS-220
OFFICE OF VEHICLE SAFETY COMPLIANCE
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SECTION 1

INTRODUCTION

1.1 PURPOSE OF COMPLIANCE TEST

A 2009 Nissan Rogue four-door MPV was tested to determine if the vehicle was in compliance with the requirements of FMVSS 138. All tests were conducted in accordance with NHTSA/Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure TP-138-03 dated July 12, 2007.

1.2 TEST VEHICLE

The test vehicle was a 2009 Nissan Rogue four-door MPV. Nomenclatures applicable to the test vehicle are:

A. Vehicle Identification Number: JN8AS58T59W320598

B. NHTSA Number: C95205

C Manufacturer: Nissan Motor Company, Ltd.

D. Manufacture Date: 07/2008

1.3 TEST DATE

The test vehicle was tested during the time period April 7 through April 14, 2009.

SECTION 2

TEST PROCEDURE AND SUMMARY OF RESULTS

2.1 TEST PROCEDURE

Prior to test, the test vehicle was inspected for completeness, systems operability, and appropriate fuel and liquid levels, i.e. oil and coolant. The vehicle was then photographically documented as required by the NHTSA/OVSC Test Procedure. Tire sidewall information was recorded. The owner's manual was reviewed, and pertinent tire and TPMS information were noted. Telltale's symbol, color, location, and lamp function were checked.

Subsequent events included weighing the vehicle to establish the Unloaded Vehicle Weight (UVW) and the distribution of weight on the front and rear axles and each wheel position. The vehicle was loaded to its Lightly Loaded Vehicle Weight (LLVW) for three tire deflation scenarios. This LLVW included the weights of driver, one passenger, and test equipment. The vehicle was loaded to its Unloaded Vehicle Weight plus Vehicle Capacity Weight (VCW) for three additional tire deflation scenarios. The VCW included the weights of driver, one passenger, test equipment, ballast in the rear seat, and ballast in the rear cargo area. The vehicle is required to be loaded to its maximum capacity without exceeding either the Vehicle Capacity Weight or Gross Vehicle Weight Rating (GVWR). For determination of the telltale warning activation pressure, the recommended cold inflation pressure was identified from the vehicle placard.

The vehicle was instrumented with a Racelogic VBOX III 100 Hz GPS Data Logger and brake pedal trigger. The VBOX uses GPS to measure vehicle speed, time, and distance. Test data were recorded to a compact flash card. During the test, a stopwatch was used to determine the approximate "cumulative driving time" during each test phase. Cumulative driving time does not include time during the brake application or when the vehicle speed was below 50 km/h or above 100 km/h. Upon completion of a tire deflation scenario, graphs were generated by VBOX software showing vehicle speed versus time during the test procedures. The graphs furnish a second-by second analysis of each calibration and low inflation pressure detection phase (as appropriate). The cumulative driving time was calculated by post-processing the VBOX graph data, and is reported in Section 3 (Test Data) as 'Total Driving Time'.

The tire deflation test scenario consisted of four phases:

1. Calibration phase: Tires were set at vehicle placard cold inflation pressure and the vehicle was driven for at least twenty minutes of cumulative driving time between 50 and 100 km/h.

2. Detection phase: Immediately after calibration phase, the selected tire(s) were deflated to seven kPa (one psi) below the Telltale Warning Activation Pressure. After one minute, the inflation pressure(s) of only deflated tire(s) were rechecked and adjusted if necessary. The vehicle was started and driven to ensure that the low inflation pressure telltale illuminated, unless the TPMS low tire pressure telltale illuminated prior to engaging of transmission.
3. Cool down phase: Vehicle was parked in the San Angelo Test Facility (SATF) open bay shielded from direct sunlight. Tires were allowed to cool down for a minimum of one hour. After cool down, the vehicle was started and the low tire pressure telltale was checked for re-illumination.
4. Extinguishment phase: Tires were adjusted to vehicle placard cold inflation pressure. The vehicle was started and driven to ensure that the low inflation pressure telltale extinguished, unless the TPMS low tire pressure telltale extinguished prior to engaging of transmission.

Two malfunction scenarios were performed on the Nissan Rogue. The first scenario was performed with the vehicle loaded to its LLVW. The malfunction was simulated by placing the compact spare tire, with no TPMS sensor, on the right front wheel position. The second scenario was performed by removing the TPMS module.

2.2 SUMMARY OF RESULTS

Three tire deflation scenarios were performed on the test vehicle at LLVW:

A. Right front
B. Left front and right front
C. Left front, left rear, right rear, and right front

Three tire deflation scenarios were performed on the test vehicle at UVW + VCW:

D. Left rear
E. Left rear and right rear
F. Left rear, right rear, and right front

The data indicate compliance of the test vehicle's tire pressure monitoring system for the six tire deflation scenarios tested.

One malfunction detection scenario was performed on the test vehicle at LLVW:

G. Spare tire without TPMS sensor was applied to right front wheel position.

A second detection scenario was performed on the test vehicle:

H. The TPMS module was removed.

In both scenarios, the vehicle's combination malfunction telltale properly operated per the standard's requirements.

SECTION 3

TEST DATA

FMVSS No. 138 – TEST DATA SUMMARY

TEST DATES: April 7 – April 14, 2009 LAB: U. S. DOT San Angelo Test Facility

VIN: JN8AS58T59W320598 VEHICLE NHTSA NUMBER: C95205

CERTIFICATION LABEL BUILD DATE: 07/2008

REQUIREMENTS	PASS/FAIL
LOW TIRE PRESSURE WARNING TELLTALE S138: S4.3.1 (a), (b); S4.3.3 (a), (b)	
Mounting	**PASS**
Symbol and color	**PASS**
Check of lamp function	**PASS**
MALFUNCTION TELLTALE S138: S4.4 (b) or (c)	
Mounting	**PASS**
Symbol and color	**PASS**
Check of lamp function	**PASS**
LOW TIRE PRESSURE WARNING - OPERATIONAL PERFORMANCE S138: S4.2, S4.3.1 (c), S4.3.2	
Telltale illumination	**PASS**
MALFUNCTION INDICATOR – OPERATIONAL PERFORMANCE S138: S4.4 (a)	
Telltale illumination	**PASS**
TPMS WRITTEN INSTRUCTIONS S138: S4.5	
Image of telltales	**PASS**
Verbatim statements	**PASS**

REMARKS: None

DATA SHEET 1 (Sheet 1 of 3)
TEST PREPARATION INFORMATION

TEST DATE: April 8, 2009 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205 VIN: JN8AS58T59W320598

CERTIFICATION LABEL BUILD DATE: 07/2008 ENGINE: 2.5 liter 4 cylinder

MY/MAKE/MODEL/BODY STYLE: 2009 Nissan Rogue four-door MPV

TIRE CONDITIONING:

(X) Tires used more than 100 km. Actual odometer reading : 109 km (68 mi)

VEHICLE ALIGNMENT AND WHEEL BALANCING:

Alignment checked: ( ) Front ( ) Rear (X) COTR waived

Wheels balanced: ( ) Front ( ) Rear (X) COTR waived

TPMS IDENTIFICATION:

TPMS MAKE/MODEL: Receiver: Calsonic Kansei Corp.;
Sensor: Schraeder Electronics, Ltd., part # / model – 40700
JA01C / SEN UNIT- TIRE PRESS

Source: Manufacturer supplied information

TPMS TYPE: (X) Direct ( ) Indirect ( ) Other

Does TPMS require execution of a learning/calibration driving phase? ( )YES (X)NO

Source: Manufacturer supplied information

Does TPMS have a manual reset control? ( )YES (X)NO

TPMS MALFUNCTION INDICATOR TYPE:

( ) None ( ) Dedicated Telltale (X) Combination low tire pressure/malfunction telltale

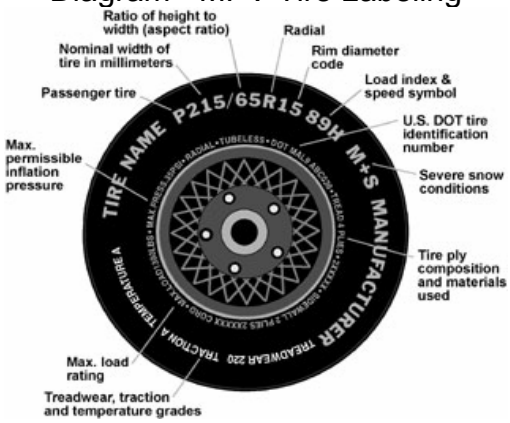
DATA SHEET 1 (Sheet 2 of 3)
TEST PREPARATION INFORMATION

DESIGNATED TIRE SIZE(S) FROM VEHICLE LABELING AND OWNER'S MANUAL:

Axle	Tire Size	Recommended Cold Inflation Pressure	Source
Front	P215/70R16	230 kPa (33 psi)	Vehicle certification label and vehicle placard
Rear	P215/70R16	230 kPa (33 psi)	Vehicle certification label and vehicle placard

INSTALLED TIRE DATA

Diagram - MPV Tire Labeling



Front and Rear Axles

Tire Size and Load Index / Speed Rating: P215/70R16 99H

Manufacturer/Tire Name: Continental 4x4 Contact

Sidewall Max Load Rating: 775 kg (1,709 lbs)

Max Inflation Pressure: 300 kPa (44 psi)

Sidewall Construction (number of plies and ply material): 1 polyester

Tread Construction (number of plies and ply material): 1 polyester, 2 steel

Do all installed tires have the same sidewall information? (X)YES ( )NO

Are all installed tires the same as designated by the vehicle manufacturer on the vehicle placard? (X)YES ( )NO

DATA SHEET 1 (Sheet 3 of 3)
TEST PREPARATION

Worksheet for Determining FMVSS No. 138 Telltale Warning Activation Pressure for Tires Installed on Vehicle		
Part	**Front Axle**	**Rear Axle**
(A) Recommended Inflation Pressure x .75	230 kPa x .75 = 172.5 kPa	230 kPa x .75 = 172.5 kPa
(B) Information from FMVSS 138 Table 1 below, Tire types are: Inflation pressure Minimum activation pressures from Table 1	(X) P-metric-Standard load ( ) P-metric-Extra Load Load Range ( ) C, ( ) D, or ( ) E (X) Maximum or ( ) Rated 300 kPa (44 psi) 140 kPa (20 psi)	(X) P-metric-Standard load ( ) P-metric-Extra Load Load Range ( ) C, ( ) D, or ( ) E (X) Maximum or ( ) Rated 300 kPa (44 psi) 140 kPa (20 psi)
(C) Telltale Warning Activation Pressure is the higher of Part (A) or (B)	172.5 kPa (25 psi)	172.5 kPa (25 psi)
(D) Pressure at which to deflate tire(s) = (C) – 7 kPa	165.5 kPa (24 psi)	165.5 kPa (24 psi)

FMVSS 138 Table 1 - Low Tire Pressure Warning Telltale - Minimum Activation Pressure

Tire Type	**Maximum or Rated Inflation Pressure**		**Minimum Activation Pressure**	
	(kPa)	**(psi)**	**(kPa)**	**(psi)**
P-metric -- Standard Load	240, 300, or 350	35, 44, or 51	140 140 140	20 20 20
P-metric - Extra Load	280 or 340	41 or 49	160 160	23 23
Load Range C	350	51	200	29
Load Range D	450	65	240	35
Load Range E	550	80	240	35

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 8, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 2 (Sheet 1 of 2)
LOW TIRE PRESSURE WARNING AND MALFUNCTION TELLTALE

TEST DATE: April 8, 2009 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

TPMS Low Tire Pressure Warning Telltale

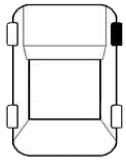
Telltale is mounted inside the occupant compartment in front of and in clear view of the driver?

(X)YES ( )NO (fail)

TPMS Low Tire Pressure Warning Telltale Location: To the right of the tachometer in dash gauge cluster

Identify Telltale Symbol Used (check box above figure).

[X] 

[ ] 

[ ] OTHER (fail)
(describe below)

Note any words or additional symbols used: None

Telltale is part of a reconfigurable display? ( )YES (X)NO

TPMS Malfunction Telltale

( ) None ( ) Dedicated stand-alone (X) Combined with low tire pressure telltale

DATA SHEET 2 (Sheet 2 of 2)
LOW TIRE PRESSURE WARNING AND MALFUNCTION TELLTALE

Check Telltale Lamp Functions:

COMBINATION LOW TIRE PRESSURE WARNING AND MALFUNCTION TELLTALE

Ignition locking system position when telltale illuminates during lamp check:

[ ] OFF/LOCK [ ] Between OFF/LOCK and ON/RUN

[X] ON/RUN [ ] Between ON/RUN and START

Is the telltale yellow in color? (X)YES ( )NO (fail)

Time telltale remains illuminated 1 second.

Starter Interlocks:

Does vehicle have any starter, transmission or other interlocks that affect operation of the telltale lamp check function? ( )YES (X)NO

Low Tire Pressure Warning and Malfunction Telltales (PASS/FAIL) PASS

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 8, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 3 (Sheet 1 of 22)
TPMS OPERATIONAL PERFORMANCE

TEST DATE: April 8, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

Time: Start: 9:50 am End: 10:30 am

Ambient Temperature: Start: 17.3°C (67.8°F) End: 19.2°C (73.0°F)

Odometer Reading: Start: 109 km (68 mi)

Fuel Level: Start: Full

Weather Conditions: Breezy, mostly sunny

Time vehicle remained with engine off and tires shielded from direct sunlight (1 hour minimum): overnight

PRE-TEST TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Pre-test cold measurements after ambient soak: Inflation Pressure	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)
Tire Sidewall Temp	17.8°C (64.0°F)	18.2°C (64.8°F)	18.2°C (64.8°F)	17.8°C (64.0°F)

DATA SHEET 3 (Sheet 2 of 22)
TPMS OPERATIONAL PERFORMANCE

VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: 1,920 kg (4,233lbs)

GAWR (front): 1,017 kg (2,241 lbs)

GAWR (rear): 911 kg (2,008 lbs)

Vehicle Capacity Weight:

Vehicle Capacity Weight 408 kg (900 lbs)

Measured Unloaded Vehicle Weight:

LF	454 kg (1,002 lbs)	LR	294 kg (648 lbs)
RF	443 kg (976 lbs)	RR	303 kg (669 lbs)
Front Axle	897 kg (1,978 lbs)	Rear Axle	597 kg (1,317 lbs)

Total Vehicle 1,494 kg (3,295 lbs)

Measured Test Weight: (X) LLVW (+50, -0 kg) ( ) UVW + VCW ( ) GVWR (+0, -50 kg)

LF	505 kg (1,113 lbs)		LR	340 kg (750 lbs)	
RF	498 kg (1,098 lbs)		RR	354 kg (780 lbs)	
Front Axle	1,003 kg (2,211 lbs)	(≤ GAWR)	Rear Axle	694 kg (1,530 lbs)	(≤ GAWR)

Total Vehicle 1,697 kg (3,741 lbs) (not greater than GVWR)

Note: For scenarios A, B, C, and G, this total vehicle weight measures the vehicle loaded to Lightly Loaded Vehicle Weight (LLVW), 202 kg (446 lbs) of driver, passenger, and test equipment.

DATA SHEET 3 (Sheet 3 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO A – Right Front Tire Deflation at LLVW

TEST DATE: April 8, 2009 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

Note: See Data Sheet 3 (Sheet 2 of 22) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES BEFORE CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After loading vehicle to lightly loaded vehicle weight, positioning vehicle at selected test start point, and vehicle cool down period: Ambient Temperature: 24.4°C (75.9°F) Vehicle cool down period: overnight				
Inflation Pressure	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)
Tire Sidewall Temp	23.2°C (73.8°F)	23.4°C (74.1°F)	23.4°C (74.1°F)	23.0°C (73.4°F)
San Angelo Test Facility Shop Floor Temp	19.6°C (67.3°F)	19.2°C (66.6°F)	19.2°C (66.6°F)	19.0°C (66.2°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	17:00:42 UTC	End:	17:25:08 UTC
Trip Odometer Reading:	Start:	112.0 km (69.6 mi)	End:	143.9 km (89.4 mi)
Ambient Temperature:	Start:	24.4°C (75.9°F)	End:	25.4°C (77.7°F)
Roadway Temperature:	Start:	33.2°C (91.8°F)	End:	35.2°C (95.4°F)

Driving in first direction:

Starting point: Goodfellow Air Force Base (GAFB) north gate Direction: see chart, page 61

10:14 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 61

10:27 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 99.3 km/h (61.7 mph)

Total Driving Time: 20:41 minutes (VBox time)

DATA SHEET 3 (Sheet 4 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO A – Right Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	251.0 kPa (36.4 psi)	247.1 kPa (35.8 psi)	249.2 kPa (36.1 psi)	252.5 kPa (36.6 psi)
Tire Sidewall Temp	37.2°C (99.0°F)	34.4°C (93.9°F)	33.4°C (92.1°F)	34.8°C (94.6°F)
San Angelo Test Facility Shop Floor Temp	20.4°C (68.7°F)	20.4°C (68.7°F)	20.2°C (68.4°F)	19.8°C (67.6°F)

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Indicate Location of Tire(s) Deflated: ( )LF ( )LR ( )RR (X)RF Inflation Pressure				165.5 kPa (24.0 psi)

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: west

1:58 minutes (stopwatch time – non-cumulative) 0.5 km (.3 mi) distance

TELLTALE ILLUMINATES WITHIN 20 MINUTES: (X)YES ( )NO (fail)

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

DATA SHEET 3 (Sheet 5 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO A – Right Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After vehicle cool down period: Ambient Temperature: 30.3°C (86.5°F) Vehicle cool down period: 61 minutes				
Inflation Pressure	239.7 kPa (34.8 psi)	236.4 kPa (34.3 psi)	238.0 kPa (34.5 psi)	158.5 kPa (23.0 psi)
Tire Sidewall Temp	27.6°C (81.7°F)	28.2°C (82.8°F)	27.4°C (81.3°F)	27.2°C (81.0°F)
San Angelo Test Facility Shop Floor Temp	21.6°C (70.9°F)	22.4°C (72.3°F)	21.8°C (71.2°F)	21.2°C (70.2°F)

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the "On" or "Run" position? (X)YES ( )NO (fail)

TELLTALE EXTINGUISHMENT:

RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After illumination verification: Re-adjusted Inflation Pressure:	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)

Is it necessary to drive the vehicle to extinguish the telltale? (X)YES ( )NO

Starting point: San Angelo Test Facility shop

0:30 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL) **PASS**
Right front tire was deflated at LLVW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 8, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 3 (Sheet 6 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO B – Left Front and Right Front Tire Deflation at LLVW

TEST DATE: April 9, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

Note: See Data Sheet 3 (Sheet 2 of 22) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES BEFORE CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After loading vehicle to lightly loaded vehicle weight, positioning vehicle at selected test start point, and vehicle cool down period: Ambient Temperature: 19.4°C (66.9°F) Vehicle cool down period: overnight				
Inflation Pressure	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)
Tire Sidewall Temp	21.0°C (69.8°F)	20.4°C (68.7°F)	20.4°C (68.7°F)	20.4°C (68.7°F)
San Angelo Test Facility Shop Floor Temp	20.8°C (69.4°F)	20.8°C (69.4°F)	20.8°C (69.4°F)	21.0°C (69.8°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	13:14:20 UTC	End:	13:38:26 UTC
Trip Odometer Reading:	Start:	146.6 km (91.1 mi)	End:	178.5 km (110.9 mi)
Ambient Temperature:	Start:	19.4°C (66.9°F)	End:	19.1°C (66.4°F)
Roadway Temperature:	Start:	16.8°C (62.2°F)	End:	18.8°C (65.8°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 62

10:13 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 62

10:26 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 98.8 km/h (61.4 mph)

Total Driving Time: 20:39 minutes (VBox time)

DATA SHEET 3 (Sheet 7 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO B – Left Front and Right Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	245.4 kPa (35.6 psi)	242.7 kPa (35.2 psi)	242.8 kPa (35.2 psi)	245.4 kPa (35.6 psi)
Tire Sidewall Temp	29.2°C (84.6°F)	26.8°C (80.2°F)	26.4°C (79.5°F)	28.0°C (82.4°F)
San Angelo Test Facility Shop Floor Temp	20.4°C (68.7°F)	20.4°C (68.7°F)	20.4°C (68.7°F)	20.4°C (68.7°F)

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Indicate Location of Tire(s) Deflated: (X)LF ( )LR ( )RR (X)RF Inflation Pressure	165.5 kPa (24.0 psi)			165.5 kPa (24.0 psi)

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: west

0:57 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TELLTALE ILLUMINATES WITHIN 20 MINUTES: (X)YES ( )NO (fail)

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

DATA SHEET 3 (Sheet 8 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO B – Left Front and Right Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After vehicle cool down period: Ambient Temperature: 23.8°C (74.8°F) Vehicle cool down period: 60 minutes				
Inflation Pressure	160.2 kPa (23.2 psi)	234.2 kPa (34.0 psi)	233.2 kPa (33.8 psi)	160.3 kPa (23.2 psi)
Tire Sidewall Temp	22.8°C (73.0°F)	22.6°C (72.7°F)	22.2°C (72.0°F)	23.0°C (73.4°F)
San Angelo Test Facility Shop Floor Temp	21.2°C (70.2°F)	21.2°C (70.2°F)	21.0°C (69.8°F)	21.2°C (70.2°F)

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the "On" or "Run" position? (X)YES ( )NO (fail)

TELLTALE EXTINGUISHMENT:
RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After illumination verification: Re-adjusted Inflation Pressure:	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)

Is it necessary to drive the vehicle to extinguish the telltale? (X)YES ( )NO

Starting point: San Angelo Test Facility shop

0:46 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TPMS Performance Test Results (PASS/FAIL) **PASS**
Left front and right front tires were deflated at LLVW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 9, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 3 (Sheet 9 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO C – Left Front, Left Rear, Right Rear, Right Front Tire Deflation at LLVW

TEST DATE: April 9, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

Note: See Data Sheet 3 (Sheet 2 of 22) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES BEFORE CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After loading vehicle to lightly loaded vehicle weight, positioning vehicle at selected test start point, and vehicle cool down period: Ambient Temperature: 27.8°C (82.0°F) Vehicle cool down period: 62 minutes				
Inflation Pressure	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)
Tire Sidewall Temp	25.2°C (77.4°F)	25.8°C (78.4°F)	26.8°C (80.2°F)	26.0°C (78.8°F)
San Angelo Test Facility Shop Floor Temp	22.8°C (73.0°F)	22.8°C (73.0°F)	23.2°C (73.8°F)	22.6°C (72.7°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	16:17:11 UTC	End:	16:41:28 UTC
Trip Odometer Reading:	Start:	180.4 km (112.1 mi)	End:	212.3 km (131.9 mi)
Ambient Temperature:	Start:	27.8°C (82.0°F)	End:	27.8°C (82.0°F)
Roadway Temperature:	Start:	33.2°C (91.8°F)	End:	36.8°C (98.2°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 63

10:09 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 63

10:30 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 99.8 km/h (62.0 mph)

Total Driving Time: 20:39 minutes (VBox time)

DATA SHEET 3 (Sheet 10 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO C – Left Front, Left Rear, Right Rear, Right Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	248.1 kPa (36.0 psi)	246.2 kPa (35.7 psi)	245.2 kPa (35.6 psi)	248.1 kPa (36.0 psi)
Tire Sidewall Temp	37.8°C (100.0°F)	36.0°C (96.8°F)	33.8°C (92.8°F)	35.8°C (96.4°F)
San Angelo Test Facility Shop Floor Temp	23.6°C (74.5°F)	23.8°C (74.8°F)	23.6°C (74.5°F)	23.2°C (73.8°F)

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Indicate Location of Tire(s) Deflated: (X)LF (X)LR (X)RR (X)RF Inflation Pressure	165.5 kPa (24.0 psi)	165.5 kPa (24.0 psi)	165.5 kPa (24.0 psi)	165.5 kPa (24.0 psi)

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: west

0:24 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TELLTALE ILLUMINATES WITHIN 20 MINUTES: (X)YES ( )NO (fail)

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

DATA SHEET 3 (Sheet 11 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO C – Left Front, Left Rear, Right Rear, Right Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After vehicle cool down period: Ambient Temperature: 26.8°C (80.2°F) Vehicle cool down period: 60 minutes				
Inflation Pressure	157.2 kPa (22.8 psi)	158.1 kPa (22.9 psi)	158.6 kPa (23.0 psi)	157.8 kPa (22.9 psi)
Tire Sidewall Temp	26.8°C (80.2°F)	26.8°C (80.2°F)	26.8°C (80.2°F)	26.6°C (79.9°F)
San Angelo Test Facility Shop Floor Temp	23.6°C (74.5°F)	23.9°C (75.0°F)	24.0°C (75.2°F)	23.6°C (74.5°F)

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the "On" or "Run" position? (X)YES ( )NO (fail)

TELLTALE EXTINGUISHMENT:
RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After illumination verification: Re-adjusted Inflation Pressure:	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)

Is it necessary to drive the vehicle to extinguish the telltale? ( )YES (X)NO

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL) **PASS**
Left front, left rear, right rear, and right front tires were deflated at LLVW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 9, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 3 (Sheet 12 of 22)
TPMS OPERATIONAL PERFORMANCE

TEST DATE: April 13, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

Time: Start: 7:30 am End: 9:15 am

Ambient Temperature: Start: 17.4°C (63.3°F) End: 17.9°C (64.2°F)

Odometer Reading: Start: 260.7 km (162.0 mi)

Fuel Level: Start: Full

Weather Conditions: Sunny, light breeze

Time vehicle remained with engine off and tires shielded from direct sunlight (1 hour minimum): overnight

PRE-TEST TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Pre-test cold measurements after ambient soak: Inflation Pressure	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)
Tire Sidewall Temp	17.9°C (64.2°F)	18.4°C (65.1°F)	18.4°C (65.1°F)	17.9°C (64.2°F)

DATA SHEET 3 (Sheet 13 of 22)
TPMS OPERATIONAL PERFORMANCE

VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: 1,920 kg (4,233 lbs)

GAWR (front): 1,017 kg (2,241 lbs)

GAWR (rear): 911 kg (2,008 lbs)

Vehicle Capacity Weight:

Vehicle Capacity Weight 408 kg (900 lbs)

Measured Unloaded Vehicle Weight:

LF	454 kg (1,002 lbs)	LR	294 kg (648 lbs)
RF	442 kg (975 lbs)	RR	304 kg (670 lbs)
Front Axle	896 kg (1,977 lbs)	Rear Axle	598 kg (1,318 lbs)

Total Vehicle 1,494 kg (3,295 lbs)

Measured Test Weight: ( ) LLVW (+50, -0 kg) (X) UVW + VCW ( ) GVWR (+0, -50 kg)

LF	511 kg (1,127 lbs)		LR	440 kg (969 lbs)	
RF	502 kg (1,106 lbs)		RR	450 kg (993 lbs)	
Front Axle	1,013 kg (2,233 lbs)	(≤ GAWR)	Rear Axle	890 kg (1,962 lbs)	(≤ GAWR)

Total Vehicle 1,903 kg (4,195 lbs) (not greater than GVWR)

Note: For scenarios D, E, and F, this Total Vehicle Weight measures the vehicle loaded to Unloaded Vehicle Weight (UVW) and Vehicle Capacity Weight (VCW), 408 kg (900 lbs) of driver, passenger, test equipment, and ballast.

DATA SHEET 3 (Sheet 14 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO D – Left Rear Tire Deflation at UVW + VCW

TEST DATE: April 13, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

Note: See Data Sheet 3 (Sheet 13 of 22) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES BEFORE CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After loading vehicle to UVW + VCW, positioning vehicle at selected test start point, and vehicle cool down period: Ambient Temperature: 18.3°C (64.9°F) Vehicle cool down period: overnight				
Inflation Pressure	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)
Tire Sidewall Temp	18.2°C (64.8°F)	18.8°C (65.8°F)	18.8°C (65.8°F)	18.2°C (64.8°F)
San Angelo Test Facility Shop Floor Temp	18.8°C (65.8°F)	19.4°C (66.9°F)	19.0°C (66.2°F)	18.4°C (65.1°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	18:20:19 UTC	End:	18:44:27 UTC
Trip Odometer Reading:	Start:	261.5 km (162.5 mi)	End:	293.4 km (182.3 mi)
Ambient Temperature:	Start:	18.3°C (64.9°F)	End:	19.3°C (66.7°F)
Roadway Temperature:	Start:	37.8°C (100.0°F)	End:	38.2°C (100.8°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 64

10:14 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 64

10:20 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 101.5 km/h (63.1 mph)

Total Driving Time: 20:34 minutes (VBox time)

DATA SHEET 3 (Sheet 15 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO D – Left Rear Tire Deflation at UVW + VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	248.6 kPa (36.1 psi)	247.6 kPa (35.9 psi)	247.5 kPa (35.9 psi)	249.3 kPa (36.2 psi)
Tire Sidewall Temp	28.4°C (83.1°F)	27.6°C (81.7°F)	28.2°C (82.8°F)	29.4°C (84.9°F)
San Angelo Test Facility Shop Floor Temp	18.4°C (65.1°F)	18.8°C (65.8°F)	18.8°C (65.8°F)	18.6°C (65.5°F)

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Indicate Location of Tire(s) Deflated: ( )LF (X)LR ( )RR ( )RF Inflation Pressure		165.5 kPa (24.0 psi)		

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: west

1:51 minutes (stopwatch time – non-cumulative) 0.6 km (0.4 mi) distance

TELLTALE ILLUMINATES WITHIN 20 MINUTES: (X)YES ( )NO (fail)

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

DATA SHEET 3 (Sheet 16 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO D – Left Rear Tire Deflation at UVW + VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After vehicle cool down period: Ambient Temperature: 21.5°C (70.7°F) Vehicle cool down period: 60 minutes				
Inflation Pressure	235.4 kPa (34.1 psi)	157.6 kPa (22.9 psi)	233.0 kPa (33.8 psi)	236.2 kPa (34.3 psi)
Tire Sidewall Temp	21.8°C (71.2°F)	21.8°C (71.2°F)	21.6°C (70.9°F)	21.6°C (70.9°F)
San Angelo Test Facility Shop Floor Temp	19.6°C (67.3°F)	19.8°C (67.6°F)	19.4°C (66.9°F)	19.6°C (67.3°F)

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the "On" or "Run" position? (X)YES ( )NO (fail)

TELLTALE EXTINGUISHMENT:
RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After illumination verification: Re-adjusted Inflation Pressure:	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)

Is it necessary to drive the vehicle to extinguish the telltale? (X)YES ( )NO

Starting point: San Angelo Test Facility shop

0:26 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL) **PASS**
Left rear tire was deflated at UVW + VCW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 13, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 3 (Sheet 17 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO E – Left Rear, Right Rear Tire Deflation at UVW + VCW

TEST DATE: April 14, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

Note: See Data Sheet 3 (Sheet 13 of 22) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES BEFORE CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After loading vehicle to UVW + VCW, positioning vehicle at selected test start point, and vehicle cool down period: Ambient Temperature: 12.2°C (54.0°F) Vehicle cool down period: overnight minutes				
Inflation Pressure	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)
Tire Sidewall Temp	14.2°C (57.6°F)	13.8°C (56.8°F)	14.2°C (57.6°F)	13.8°C (56.8°F)
San Angelo Test Facility Shop Floor Temp	16.2°C (61.2°F)	16.2°C (61.2°F)	16.2°C (61.2°F)	16.4°C (61.5°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	13:52:14 UTC	End:	14:16:17 UTC
Trip Odometer Reading:	Start:	296.3 km (184.1 mi)	End:	328.1 km (203.9 mi)
Ambient Temperature:	Start:	12.2°C (54.0°F)	End:	14.2°C (57.6°F)
Roadway Temperature:	Start:	15.0°C (59.0°F)	End:	18.4°C (65.1°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 65

10:11 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 65

10:27 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 99.2 km/h (61.6 mph)

Total Driving Time: 20:38 minutes (VBox time)

DATA SHEET 3 (Sheet 18 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO E – Left Rear, Right Rear Tire Deflation at UVW + VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	249.7 kPa (36.2 psi)	249.0 kPa (36.1 psi)	249.9 kPa (36.2 psi)	250.9 kPa (36.4 psi)
Tire Sidewall Temp	24.4°C (75.9°F)	23.9°C (75.0°F)	23.0°C (73.4°F)	24.2°C (75.6°F)
San Angelo Test Facility Shop Floor Temp	16.4°C (61.5°F)	16.2°C (61.2°F)	16.2°C (61.2°F)	16.6°C (61.9°F)

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Indicate Location of Tire(s) Deflated: ( )LF (X)LR (X)RR ( )RF Inflation Pressure		165.5 kPa (24.0 psi)	165.5 kPa (24.0 psi)	

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: west

0:42 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TELLTALE ILLUMINATES WITHIN 20 MINUTES: (X)YES ( )NO (fail)

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

DATA SHEET 3 (Sheet 19 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO E – Left Rear, Right Rear Tire Deflation at UVW + VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After vehicle cool down period: Ambient Temperature: 20.1°C (68.2°F) Vehicle cool down period: 60 minutes				
Inflation Pressure	240.5 kPa (34.9 psi)	159.9 kPa (23.2 psi)	159.9 kPa (23.2 psi)	240.7 kPa (34.9 psi)
Tire Sidewall Temp	18.9°C (66.0°F)	18.2°C (64.8°F)	18.4°C (65.1°F)	19.0°C (66.2°F)
San Angelo Test Facility Shop Floor Temp	17.4°C (63.3°F)	17.4°C (63.3°F)	17.2°C (63.0°F)	17.6°C (63.7°F)

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the "On" or "Run" position? (X)YES ( )NO (fail)

TELLTALE EXTINGUISHMENT:
RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After illumination verification: Re-adjusted Inflation Pressure:	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)

Is it necessary to drive the vehicle to extinguish the telltale? (X)YES ( )NO

Starting point: San Angelo Test Facility shop

0:21 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL) **PASS**
Left rear and right rear tires were deflated at UVW + VCW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 14, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 3 (Sheet 20 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO F – Left Front, Right Rear, and Right Front Tire Deflation at UVW +VCW

TEST DATE: April 14, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

Note: See Data Sheet 3 (Sheet 13 of 22) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES BEFORE CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After loading vehicle to UVW + VCW, positioning vehicle at selected test start point, and vehicle cool down period: Ambient Temperature: 23.9°C (75.0°F) Vehicle cool down period: 75 minutes				
Inflation Pressure	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)
Tire Sidewall Temp	20.8°C (69.4°F)	21.4°C (70.5°F)	20.6°C (69.1°F)	20.2°C (68.4°F)
San Angelo Test Facility Shop Floor Temp	19.2°C (66.6°F)	19.2°C (66.6°F)	19.0°C (66.2°F)	18.6°C (65.5°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	17:18:49 UTC	End:	17:43:28 UTC
Trip Odometer Reading:	Start:	330.1 km (205.1 mi)	End:	361.9 km (224.9 mi)
Ambient Temperature:	Start:	23.9°C (75.0°F)	End:	24.8°C (76.6°F)
Roadway Temperature:	Start:	33.0°C (91.4°F)	End:	40.2°C (104.4°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 66

10:11 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 66

10:29 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 98.9 km/h (61.5 mph)

Total Driving Time: 20:40 minutes (VBox time)

DATA SHEET 3 (Sheet 21 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO F – Left Front, Right Rear, and Right Front Tire Deflation at UVW +VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	251.9 kPa (36.5 psi)	252.5 kPa (36.6 psi)	253.8 kPa (36.8 psi)	253.1 kPa (36.7 psi)
Tire Sidewall Temp	36.4°C (97.5°F)	35.2°C (95.4°F)	35.2°C (95.4°F)	35.6°C (96.1°F)
San Angelo Test Facility Shop Floor Temp	20.0°C (68.0°F)	20.0°C (68.0°F)	20.4°C (68.7°F)	19.8°C (67.6°F)

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Indicate Location of Tire(s) Deflated: (X)LF ( )LR (X)RR (X)RF Inflation Pressure	165.5 kPa (24.0 psi)		165.5 kPa (24.0 psi)	165.5 kPa (24.0 psi)

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: west

0:46 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TELLTALE ILLUMINATES WITHIN 20 MINUTES: (X)YES ( )NO (fail)

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X)YES ( )NO (fail)

DATA SHEET 3 (Sheet 22 of 22)
TPMS OPERATIONAL PERFORMANCE

SCENARIO F – Left Front, Right Rear, and Right Front Tire Deflation at UVW +VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After vehicle cool down period: Ambient Temperature: 25.9°C (78.6°F) Vehicle cool down period: 62 minutes				
Inflation Pressure	157.4 kPa (22.8 psi)	237.7 kPa (34.5 psi)	156.5 kPa (22.7 psi)	158.0 kPa (22.9 psi)
Tire Sidewall Temp	25.2°C (77.4°F)	25.4°C (77.7°F)	24.6°C (76.3°F)	24.8°C (76.6°F)
San Angelo Test Facility Shop Floor Temp	20.6°C (69.1°F)	20.4°C (68.7°F)	20.6°C (69.1°F)	20.4°C (68.7°F)

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the "On" or "Run" position? (X)YES ( )NO (fail)

TELLTALE EXTINGUISHMENT:
RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After illumination verification: Re-adjusted Inflation Pressure:	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)	230.0 kPa (33.4 psi)

Is it necessary to drive the vehicle to extinguish the telltale? (X)YES ( )NO

Starting point: San Angelo Test Facility shop

0:19 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL) **PASS**
Left front, right rear, and right front tires were deflated at UVW +VCW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 14, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 4 (Sheet 1 of 4)
Scenario G – Malfunction Detection Test at LLVW

TEST DATE: April 10, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

Time:	Start:	13:26:25 UTC	End:	13:38:55 UTC
Trip Odometer Reading:	Start:	213.4 km (132.6 mi)	End:	228.7 km (142.1 mi)
Ambient Temperature:	Start:	12.3°C (54.1°F)	End:	13.0°C (55.4°F)
Roadway Temperature:	Start:	13.4°C (56.1°F)	End:	14.2°C (57.6°F)
Fuel Level:	Start:	Full		

Note: See Data Sheet 3 (Sheet 2 of 22) for Test Weight.

TPMS TYPE: (X) Direct ( ) Indirect ( ) Other Describe: _____

TPMS MALFUNCTION TELLTALE:
( ) Dedicated stand-alone (X) Combination low tire pressure warning/malfunction telltale

METHOD OF MALFUNCTION SIMULATION:

Describe method of malfunction simulation: Spare tire without TPMS sensor was applied to right front at LLVW.

MALFUNCTION TELLTALE ILLUMINATION
(after ignition locking system is activated to "On" ("Run") position):

Combination Malfunction Telltale

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: see chart, page 67

12:30 minutes (stopwatch time – non-cumulative) 15.3 km (9.5 mi) distance

Max speed: 100.5 km/h (62.4 mph)
Total Driving Time: 9:33 minutes (VBox time)

COMBINATION MALFUNCTION TELLTALE ILLUMINATES (FLASHING AND ILLUMINATION SEQUENCE) WITHIN 20 MINUTES:
(X)YES ( )NO

DATA SHEET 4 (Sheet 2 of 4)
Scenario G – Malfunction Detection Test at LLVW

After 5 minutes with the ignition locking system in the "Off" or "Lock" position, does the combination low tire pressure/malfunction telltale flash for a period of at least 60 seconds but no longer than 90 seconds, and then remain illuminated when the ignition locking system is activated to the "On" or "Run" position? (X)YES ( )NO (fail)

Time it takes before telltale starts flashing 1 seconds

Time telltale remains flashing 62 seconds

Time telltale remains illuminated 60+ seconds
(Verified for a minimum of 60 seconds)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale's illumination sequence repeat when the ignition locking system is activated and the engine running? (X)YES ( )NO (fail)

Extinguishment Phase:

Restore the TPMS to normal operation. Is it necessary to drive the vehicle to extinguish the telltale? (X)YES ( )NO

Starting point: San Angelo Test Facility shop

0:30 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

COMBINATION MALFUNCTION TELLTALE EXTINGUISHED:
(X)YES ( )NO (FAIL)

TPMS MALFUNCTION PERFORMANCE TEST RESULTS (PASS/FAIL) **PASS**
Spare without TPMS sensor was applied to right front at LLVW.

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 10, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 4 (Sheet 3 of 4)
Scenario H – Malfunction Detection Test

TEST DATE: April 10, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C95205

Time:	Start:	15:25:14 UTC	End:	15:37:57 UTC
Odometer Reading:	Start:	236.7 km (147.1 mi)	End:	252.2 km (156.7 mi)
Ambient Temperature:	Start:	12.9°C (55.2°F)	End:	13.6°C (56.5°F)
Roadway Temperature:	Start:	18.2°C (64.8°F)	End:	19.4°C (66.9°F)
Fuel Level:	Start:	Full		

TPMS TYPE: (X) Direct ( ) Indirect ( ) Other Describe:

TPMS MALFUNCTION TELLTALE:
( ) Dedicated stand-alone (X) Combination low tire pressure warning/malfunction telltale

METHOD OF MALFUNCTION SIMULATION:

Describe method of malfunction simulation: An under-dash TPMS module was removed.
(Vehicle wiring harness was disconnected from module.)

MALFUNCTION TELLTALE ILLUMINATION
(after ignition locking system is activated to "On" ("Run") position):

Combination Malfunction Telltale

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: see chart, page 68

12:43 minutes (stopwatch time – non-cumulative) 15.4 km (9.6 mi) distance

Max speed: 101.3 km/h (62.9 mph)
Total Driving Time: 9:33 minutes (VBox time)

COMBINATION MALFUNCTION TELLTALE ILLUMINATES (FLASHING AND ILLUMINATION SEQUENCE) WITHIN 20 MINUTES:
(X)YES ( )NO

DATA SHEET 4 (Sheet 4 of 4)
Scenario H – Malfunction Detection Test

After 5 minutes with the ignition locking system in the "Off" or "Lock" position, does the combination low tire pressure/malfunction telltale flash for a period of at least 60 seconds but no longer than 90 seconds, and then remain illuminated when the ignition locking system is activated to the "On" or "Run" position? (X)YES ( )NO (fail)

Time it takes before telltale starts flashing 1 seconds (lamp check)

Time telltale remains flashing 61 seconds

Time telltale remains illuminated 60+ seconds
(Verified for a minimum of 60 seconds)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale's illumination sequence repeat when the ignition locking system is activated and the engine running? (X)YES ( )NO (fail)

Extinguishment Phase:

Restore the TPMS to normal operation. Is it necessary to drive the vehicle to extinguish the telltale? (X)YES ( )NO

Starting point: San Angelo Test Facility shop

1:50 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

COMBINATION MALFUNCTION TELLTALE EXTINGUISHED:
(X)YES ( )NO (FAIL)

TPMS MALFUNCTION PERFORMANCE TEST RESULTS (PASS/FAIL) **PASS**
An under-dash TPMS module was removed.

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 10, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 5 (Sheet 1 of 3)
TPMS WRITTEN INSTRUCTIONS

TEST DATE: April 7, 2009 LAB: San Angelo Test Facility VEHICLE NHTSA NO: C95205

The following statement, in the English language, is provided verbatim in the Owner's Manual. (X)YES ( )NO

"Each tire, including the spare (if provided), should be checked monthly when cold and inflated to the inflation pressure recommended by the vehicle manufacturer on the vehicle placard or tire inflation pressure label. (If your vehicle has tires of a different size than the size indicated on the vehicle placard or tire inflation pressure label, you should determine the proper tire inflation pressure for those tires.)

As an added safety feature, your vehicle has been equipped with a tire pressure monitoring system (TPMS) that illuminates a low tire pressure telltale when one or more of your tires is significantly under-inflated. Accordingly, when the low tire pressure telltale illuminates, you should stop and check your tires as soon as possible, and inflate them to the proper pressure. Driving on a significantly under-inflated tire causes the tire to overheat and can lead to tire failure. Under-inflation also reduces fuel efficiency and tire tread life, and may affect the vehicle's handling and stopping ability.

Please note that the TPMS is not a substitute for proper tire maintenance, and it is the driver's responsibility to maintain correct tire pressure, even if under-inflation has not reached the level to trigger illumination of the TPMS low tire pressure telltale."

DATA SHEET 5 (Sheet 2 of 3)
TPMS WRITTEN INSTRUCTIONS

As specified, the following sections, in the English language, are required verbatim in paragraph form in the Owner's Manual:

The following statement is required for all vehicles certified to the standard starting on September 1, 2007 and for vehicles voluntarily equipped with a compliant TPMS MIL before that time.

"Your vehicle has also been equipped with a TPMS malfunction indicator to indicate when the system is not operating properly."

The above statement in the English language is provided verbatim in owner's manual:
(X)YES ( )NO

For vehicles with a dedicated MIL telltale, add the following statement:

"The TPMS malfunction indicator is provided by a separate telltale, which displays the symbol "TPMS" when illuminated."

The above statement in the English language is provided verbatim in owner's manual:
( )YES ( )NO (X)N/A

For vehicles with a combined low tire pressure/MIL telltale, add the following statement:

"The TPMS malfunction indicator is combined with the low tire pressure telltale. When the system detects a malfunction, the telltale will flash for approximately one minute and then remain continuously illuminated. This sequence will continue upon subsequent vehicle start-ups as long as the malfunction exists."

The above statement in the English language is provided verbatim in owner's manual:
(X)YES ( )NO ( )N/A

The following statement is required for all vehicles certified to the standard starting on September 1, 2007 and for vehicles voluntarily equipped with a compliant TPMS MIL before that time.

"When the malfunction indicator is illuminated, the system may not be able to detect or signal low tire pressure as intended. TPMS malfunctions may occur for a variety of reasons, including the installation of replacement or alternate tires or wheels on the vehicle that prevent the TPMS from functioning properly. Always check the TPMS malfunction telltale after replacing one or more tires or wheels on your vehicle to ensure that the replacement or alternate tires and wheels allow the TPMS to continue to function properly."

The above statement in the English language is provided verbatim in owner's manual:
(X)YES ( )NO

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

DATA SHEET 5 (Sheet 3 of 3)
TPMS WRITTEN INSTRUCTIONS

Does the Owner's Manual provide an image of the Low Tire Pressure Warning Telltale symbol (and an image of the TPMS Malfunction Telltale warning ("TPMS"), if a dedicated telltale is utilized for this function)? (X)YES ( )NO

Does the Owner's Manual include the following (allowable) information?

- [x] Significance of the low tire pressure warning telltale illuminating
- [x] A description of corrective action to be undertaken
- [x] Whether the tire pressure monitoring system functions with the vehicle's spare tire (if provided)
- [ ] How to use a reset button, if one is provided
- [ ] The time for the TPMS telltale(s) to extinguish once the low tire pressure condition or the malfunction is corrected

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 7, 2009

APPROVED BY: Kenneth H. Yates

SECTION 4

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

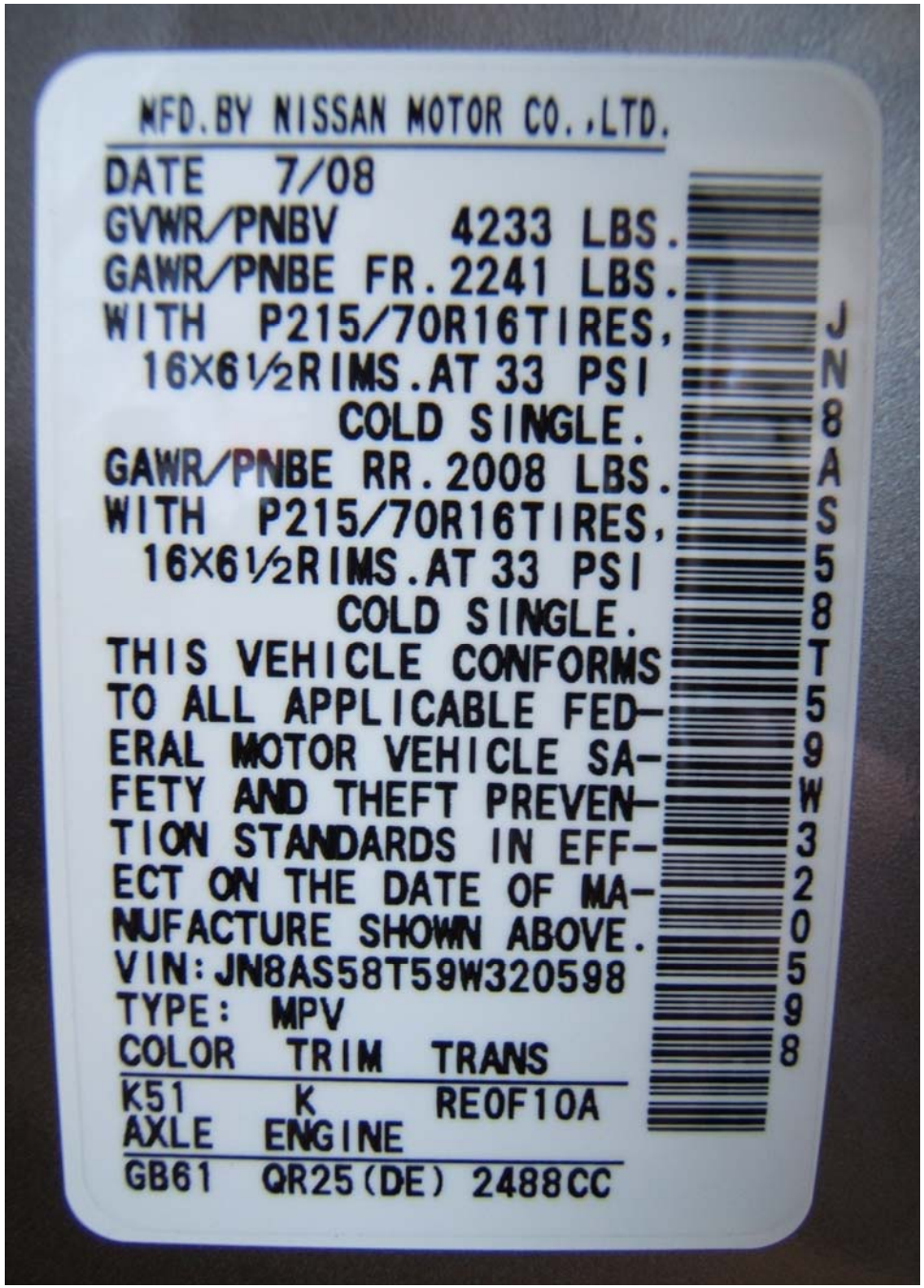
EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO	CAL. DATE	NEXT CAL. DATE
STOPWATCH	WESTCLOX QUARTZ STOPWATCH	NONE	N/A	N/A
VBOX RECORDING DEVICE	RACELOGIC VBOX III	SERIAL # 030209	3/22/2009	3/22/2010
AMBIENT TEMPERATURE GAUGE	FLUKE 179 DIGITAL THERMOMETER	SERIAL #84740316	2/12/2009	2/12/2010
LASER TEMPERATURE GAUGE (TIRES AND GROUND)	RAYTEK ST20	SERIAL 2065640101-0014	8/14/2008	8/08/2009
AIR PRESSURE GAUGE	ASHCROFT GENERAL PURPOSE DIGITAL GAUGE	MODEL # D1005PS 02L 100 PSI SERIAL # 20017398-01	11/20/2008	11/20/2009
FLOOR SCALES (VEHICLE)	INTERCOMP SW DELUXE SCALES	PART # 100156 SERIAL # 27032382	8/5/2008	8/5/2009
PLATFORM SCALE (BALLAST)	HOWE RICHARDSON	MODEL # 6401 SERIAL # 0181-5509-26	8/5/2008	8/5/2009

SECTION 5

PHOTOGRAPHS

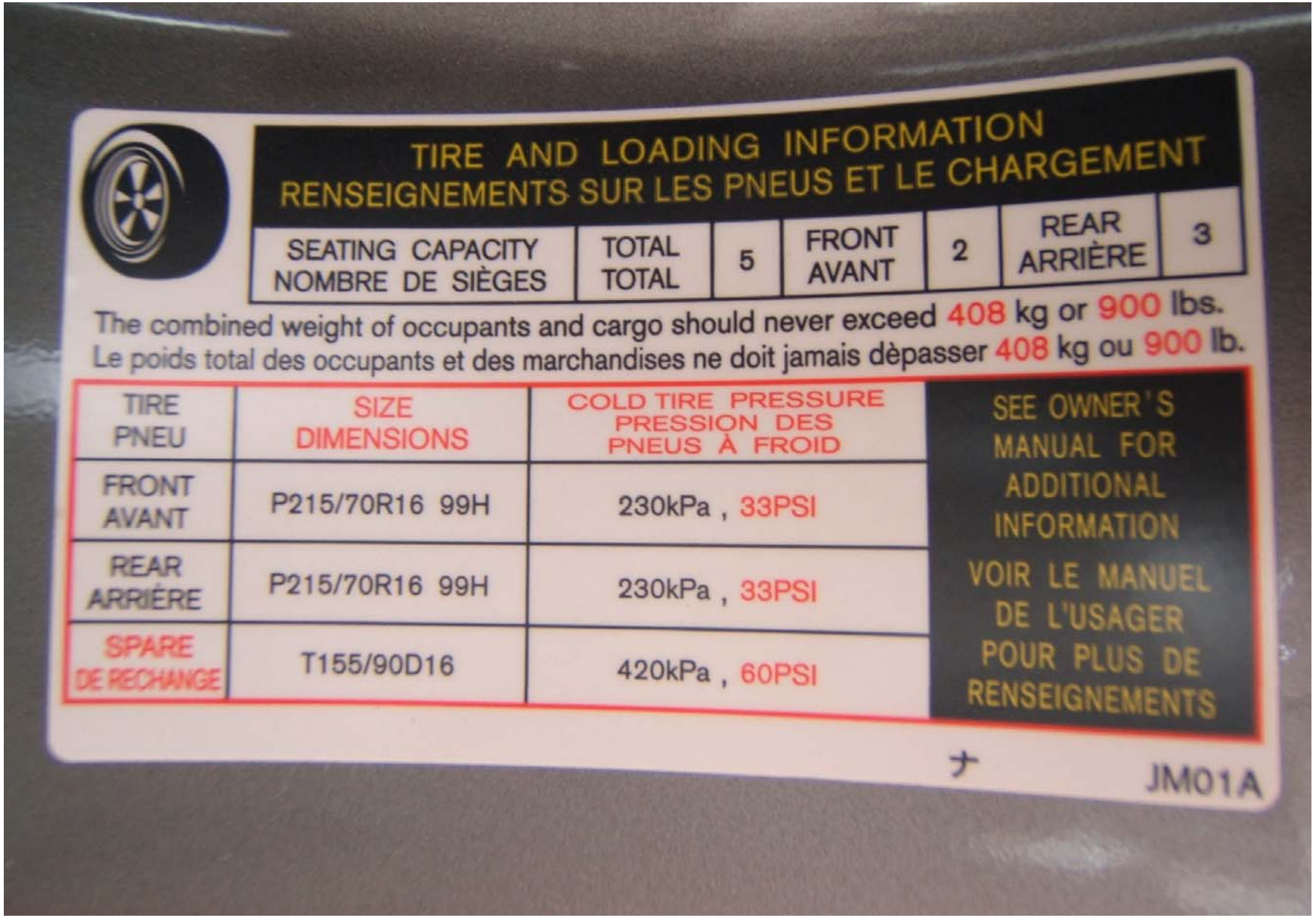
2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO.138

FIGURE 5.1
¾ FRONT VIEW FROM LEFT SIDE OF VEHICLE



2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO.138

FIGURE 5.2
VEHICLE CERTIFICATION LABEL



2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.3
VEHICLE PLACARD

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.4
TIRE SHOWING BRAND

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

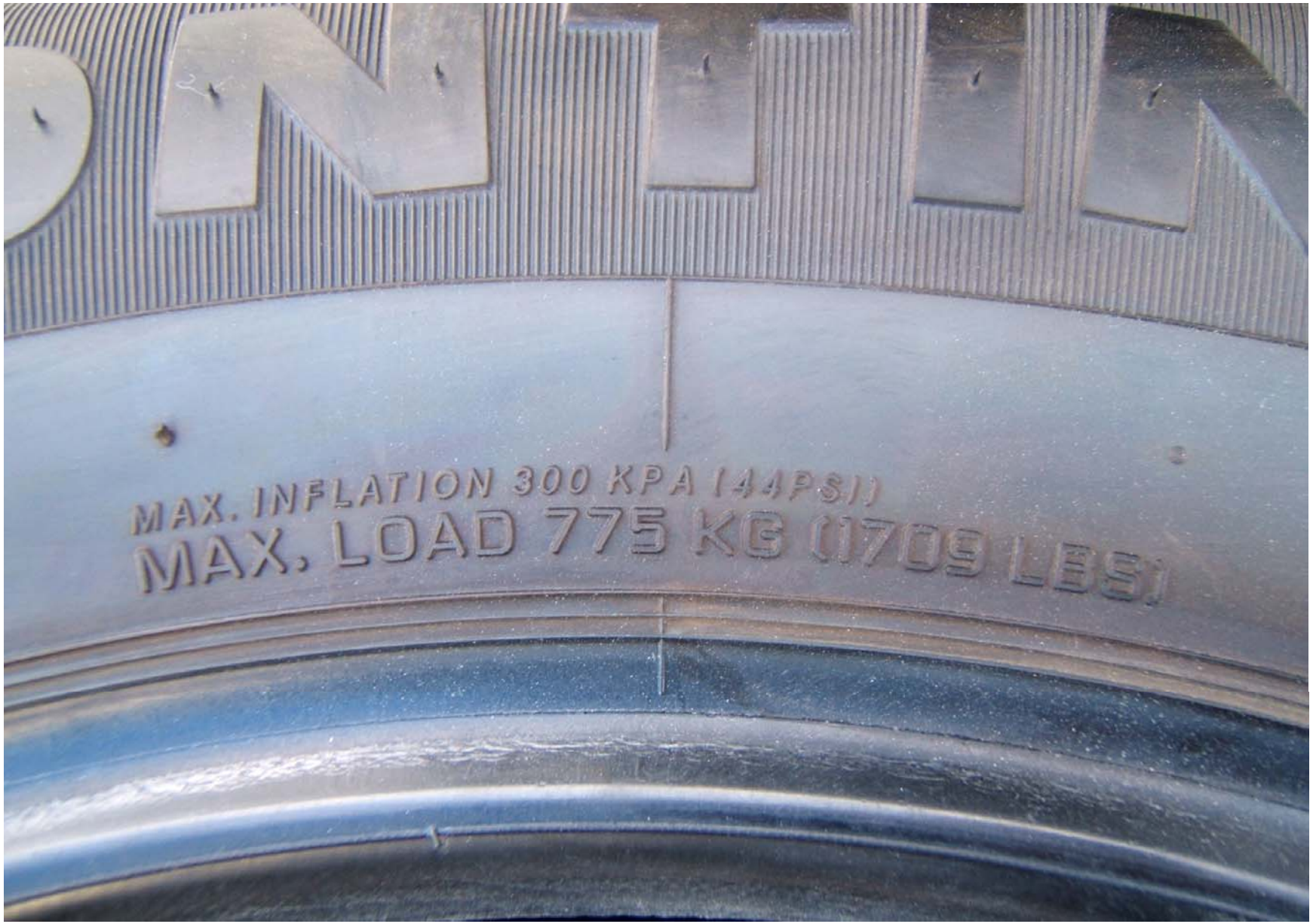
FIGURE 5.5
TIRE SHOWING MODEL

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.6
TIRE SHOWING SIZE AND LOAD INDEX / SPEED RATING

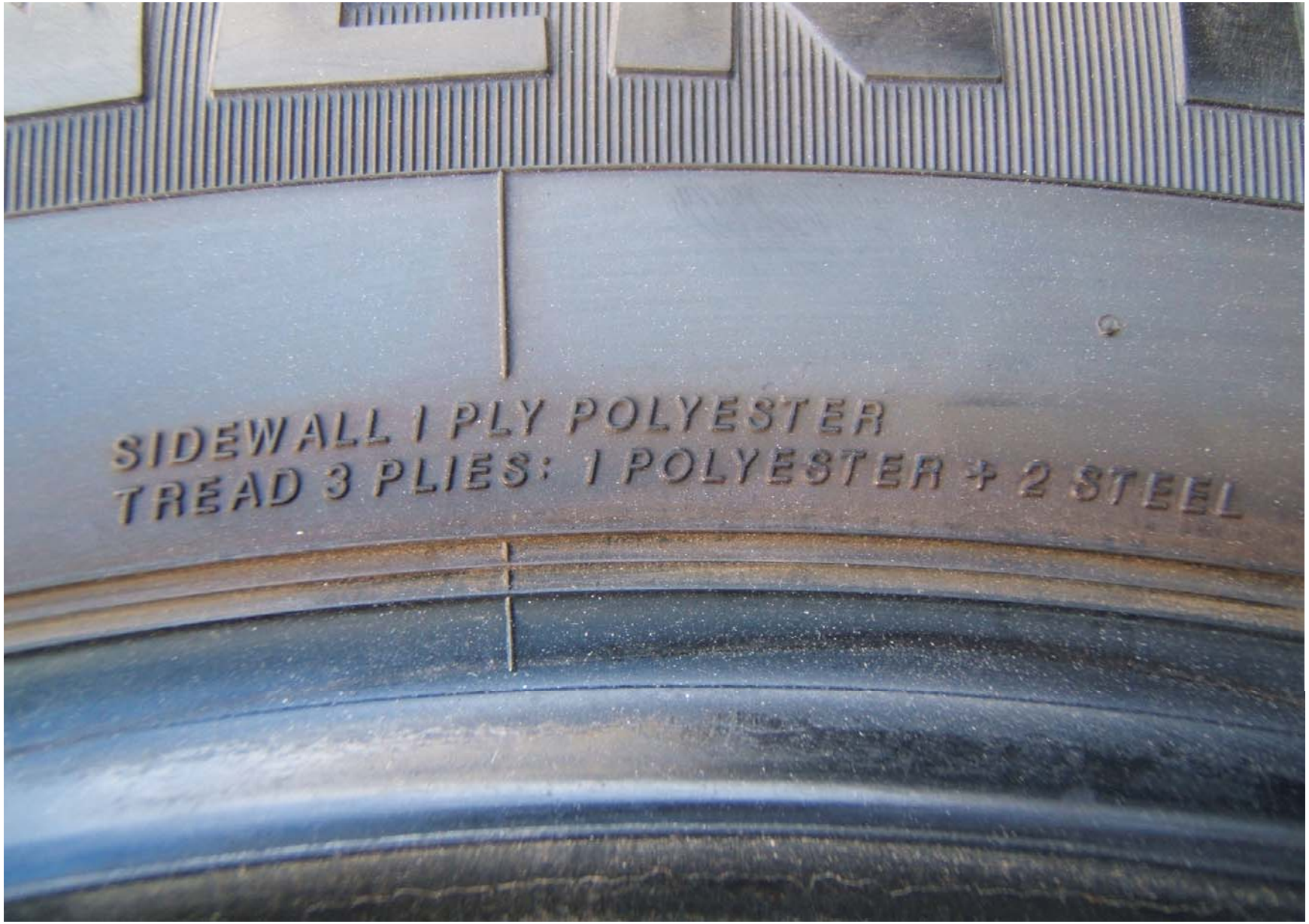
2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.7
TIRE SHOWING DOT SERIAL NUMBER



2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.8
TIRE SHOWING MAX COLD INFLATION
PRESSURE AND MAX LOAD RATING



2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.9
TIRE SHOWING SIDEWALL / TREAD CONSTRUCTION

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.10
TPMS SENSOR INSTALLED ON RIM

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.11
RIM CONTOUR FOR FULL WIDTH OF CROSS SECTION

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.12
DISPLAY SHOWING COMBINATION LOW TIRE PRESSURE WARNING / TPMS MALFUNCTION WARNING TELLTALE

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO 138

FIGURE 5.13
TEST INSTRUMENTATION INSTALLED IN VEHICLE

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.14
VEHICLE REAR SEAT BALLAST
FOR UVW + VCW LOAD

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.15
VEHICLE CARGO AREA BALLAST FOR UVW + VCW LOAD

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.16
VEHICLE ON WEIGHT SCALES

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

FIGURE 5.17
SPARE INSTALLED ON RIGHT FRONT
FOR MALFUNCTION DETECTION TEST

2009 NISSAN ROGUE
NHTSA NO. C95205
FMVSS NO. 138

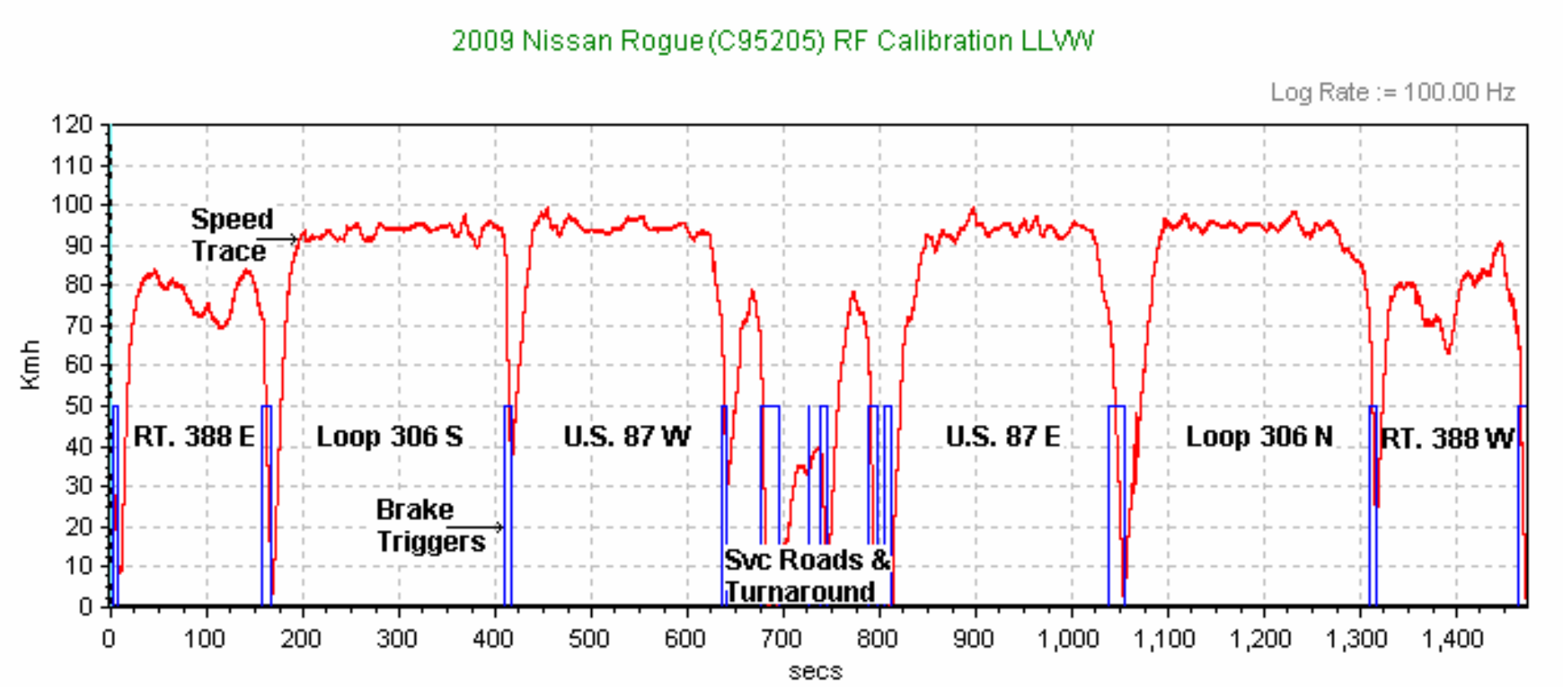
FIGURE 5.18
TPMS MODULE DISCONNECTED
FOR MALFUNCTION DETECTION TEST

SECTION 6

TEST PLOTS

Scenario A: Right Front Tire at LLVW
Test Date: 4/8/09
Data File Time: 24:35 minutes
Cumulative Driving Time: 20:41 minutes
Start Point: GAFB North Gate

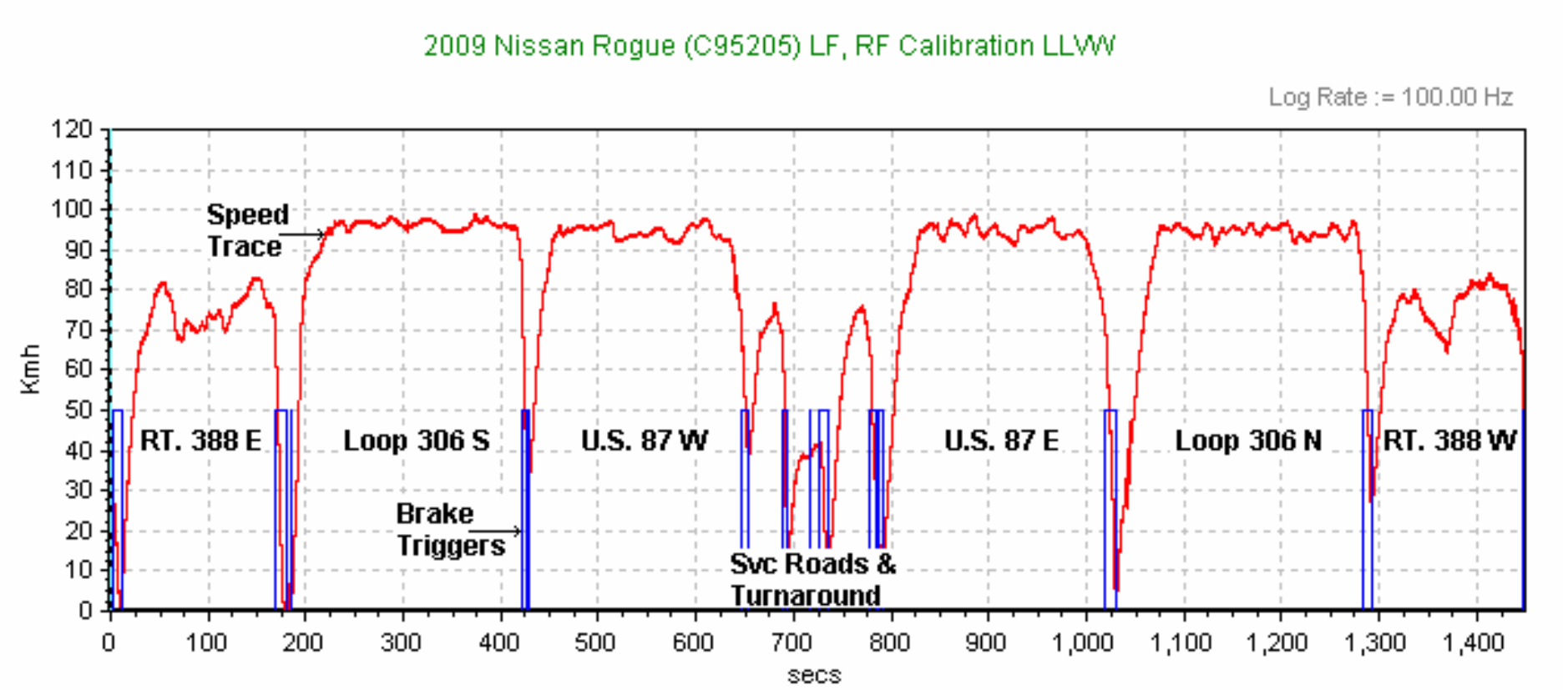
Calibration Phase:



Detection Phase: Illumination occurred in 1:58 minutes. Driving above 50 km/h was not required.

Scenario B:	Left Front, Right Front Tires at LLVW
Test Date:	4/9/09
Data File Time:	24:10 minutes
Cumulative Driving Time:	20:39 minutes
Start Point:	GAFB North Gate

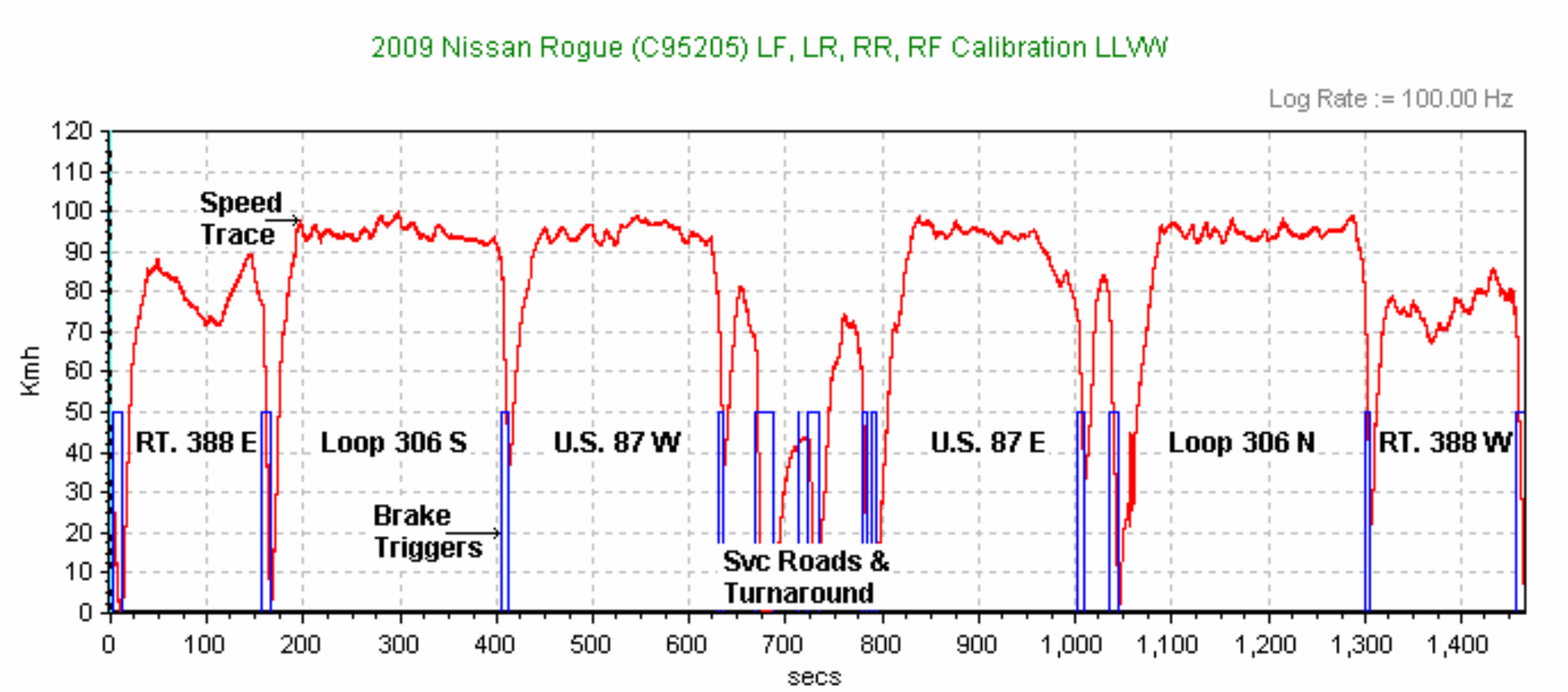
Calibration Phase:



LF, RF Detection Phase: Illumination occurred in 57 seconds. Driving above 50 km/h was not required.

Scenario C:	Left Front, Left Rear, Right Rear, Right Front Tires at LLVW
Test Date:	4/9/09
Data File Time:	24:26 minutes
Cumulative Driving Time:	20:39 minutes
Start Point:	GAFB North Gate

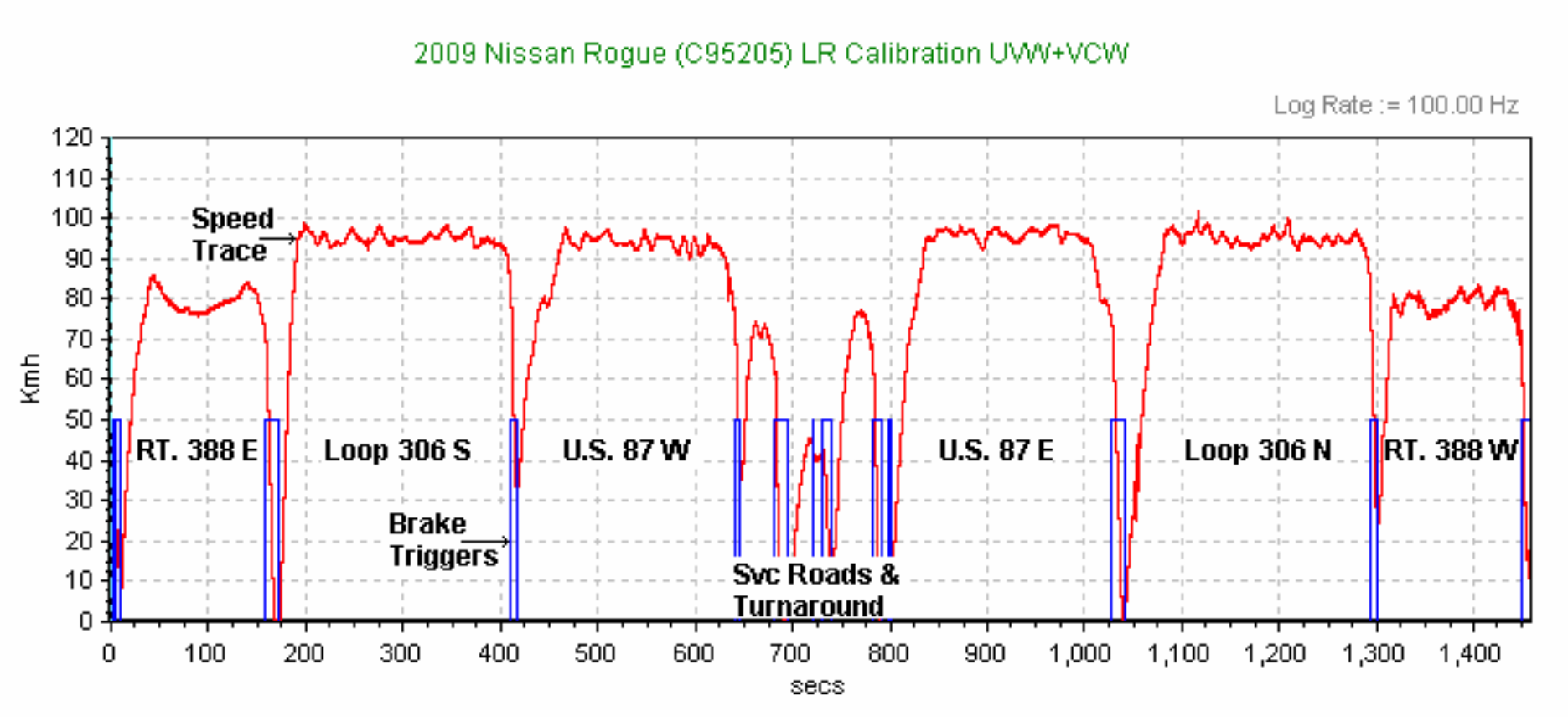
Calibration Phase:



LF, LR, RR, RF Detection Phase: Illumination occurred in 24 seconds. Driving above 50 km/h was not required.

Scenario D: Left Rear Tire at UVW + VCW
Test Date: 4/13/09
Data File Time: 24:18 minutes
Cumulative Driving Time: 20:34 minutes
Start Point: GAFB North Gate

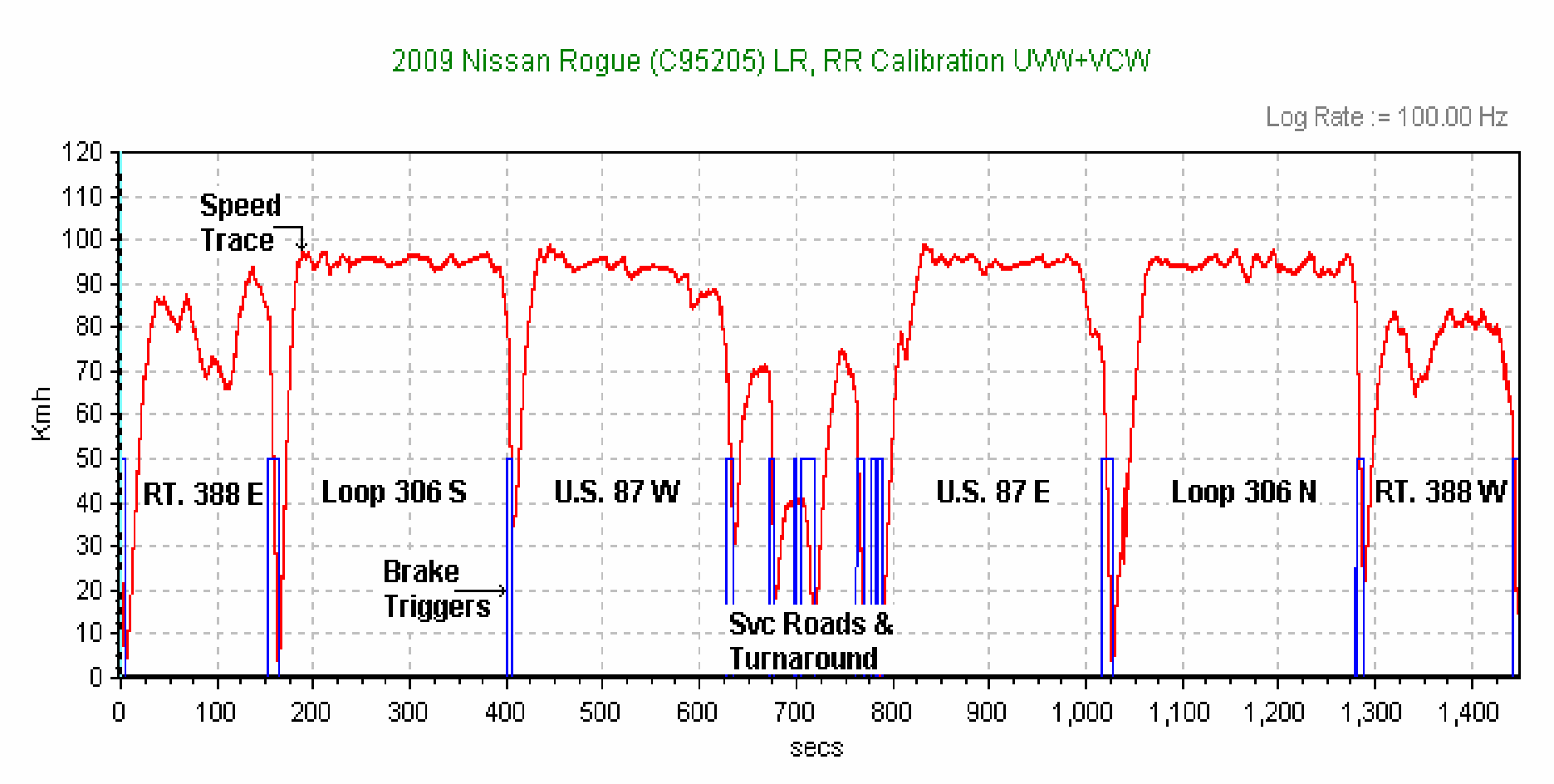
Calibration Phase:



LR Detection Phase: Illumination occurred in 1:51 minutes. Driving above 50 km/h was not required.

Scenario E:	Left Rear, Right Rear Tires at UVW + VCW
Test Date:	4/14/09
Data File Time:	24:10 minutes
Cumulative Driving Time:	20:38 minutes
Start Point:	GAFB North Gate

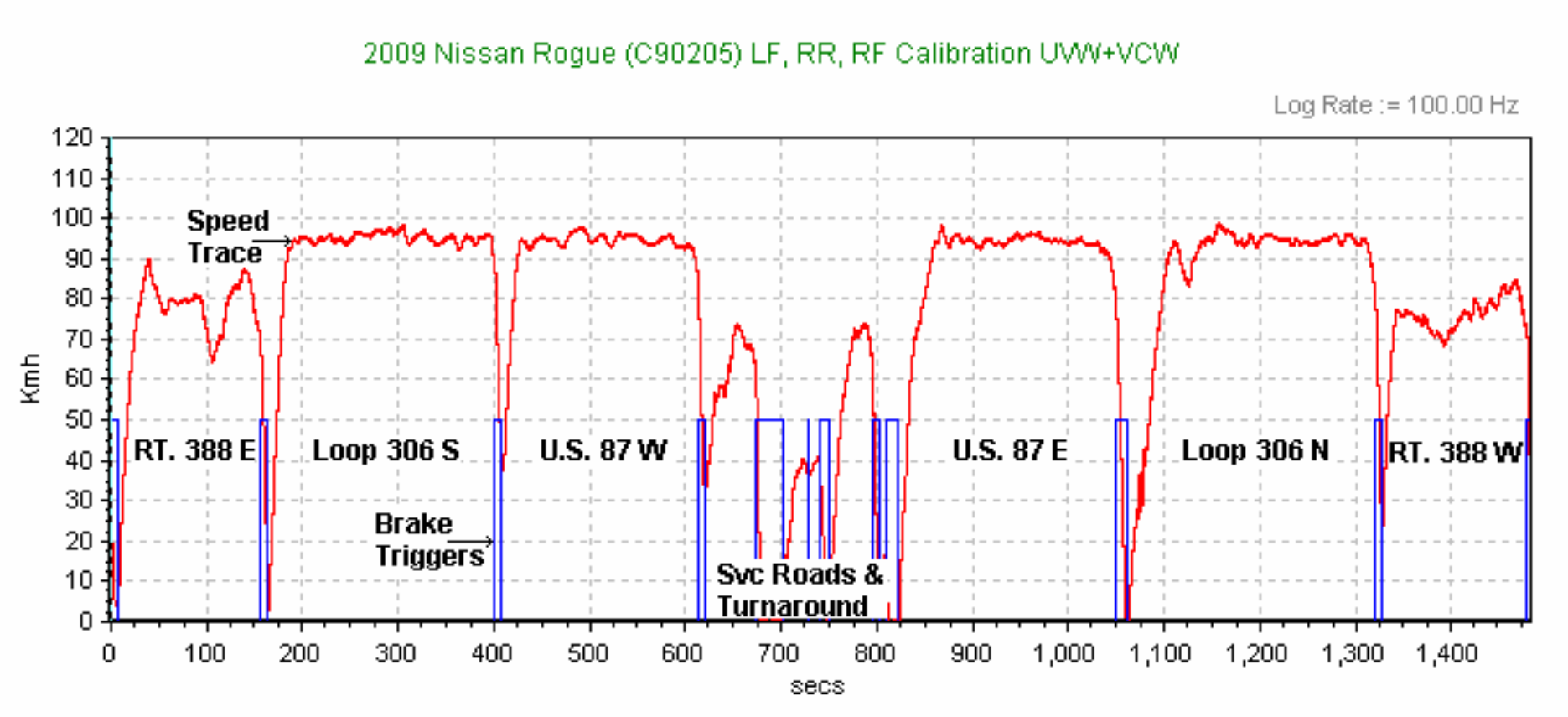
Calibration Phase:



LR, RR Detection Phase: Illumination occurred in 42 seconds. Driving above 50 km/h was not required.

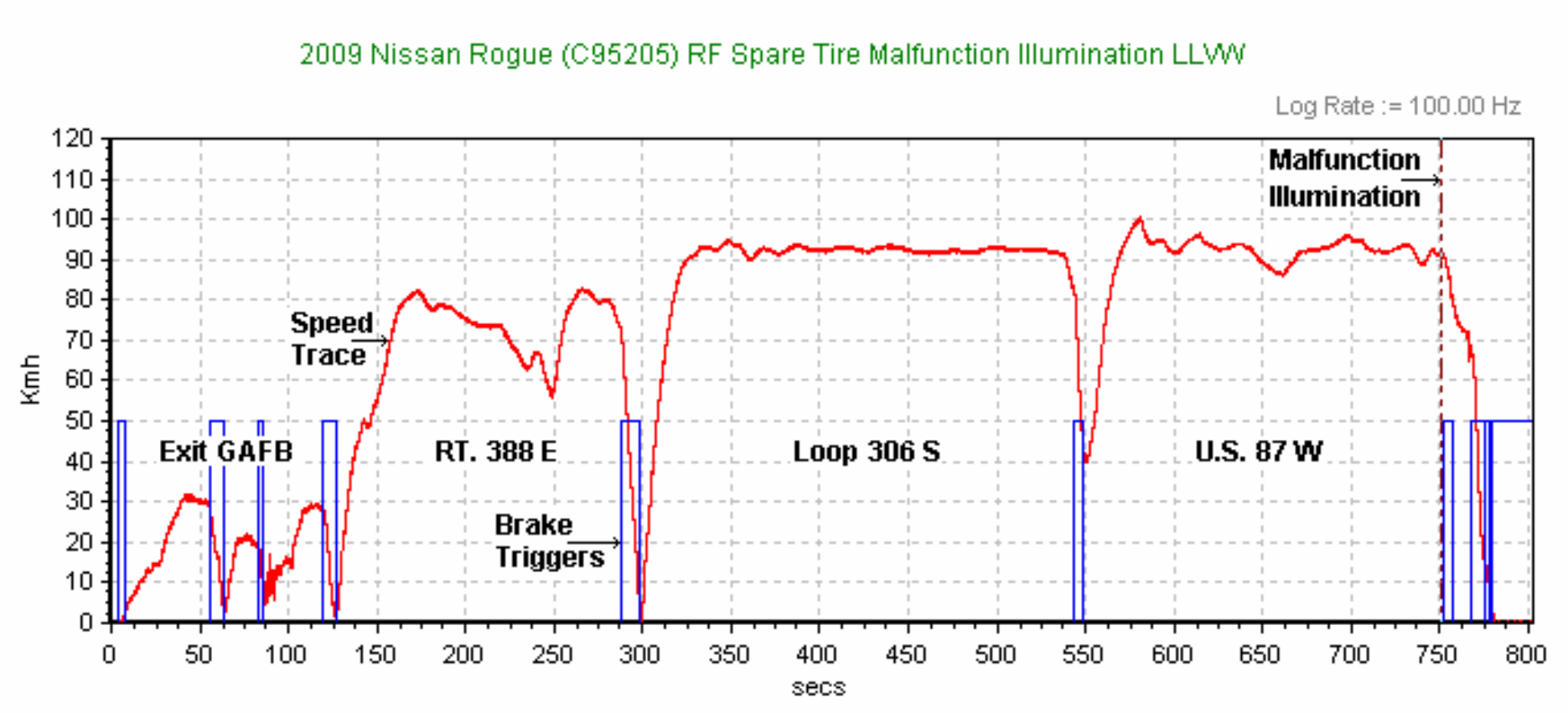
Scenario F:	Left Front, Right Rear, Right Front Tires at UVW + VCW
Test Date:	4/14/09
Data File Time:	24:43 minutes
Cumulative Driving Time:	20:40 minutes
Start Point:	GAFB North Gate

Calibration Phase:

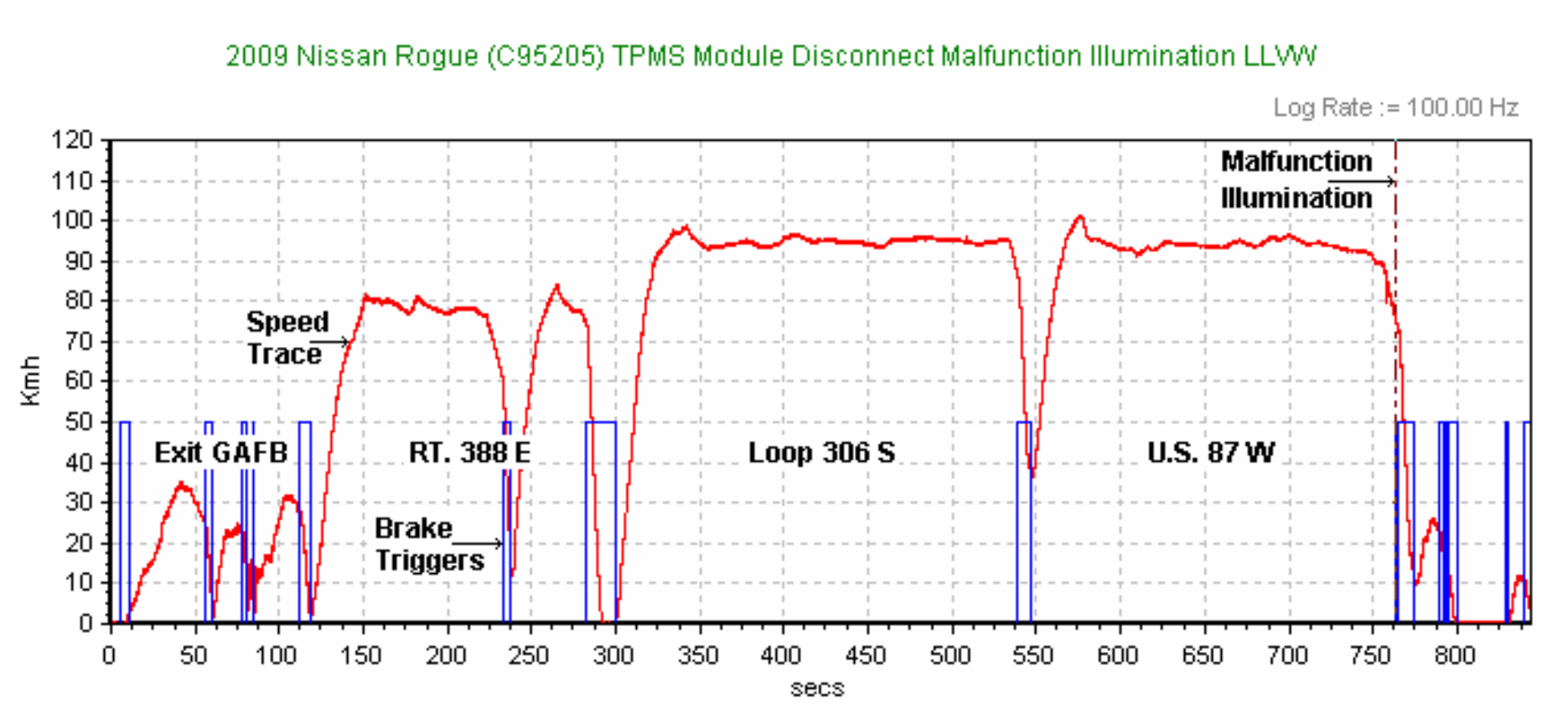


LF, RR, RF Detection Phase: Illumination occurred in 46 seconds. Driving above 50 km/h was not required.

Scenario G Malfunction Illumination:	Spare Tire without TPMS Sensor Applied to Right Front at LLVW
Test Date:	4/10/09
Data File Time:	13:23 minutes
Cumulative Driving Time:	9:33 minutes
Start Point:	San Angelo Test Facility shop



Scenario H Malfunction Illumination:	TPMS Module Disconnected
Test Date:	4/10/09
Data File Time:	14:04 minutes
Cumulative Driving Time:	9:33 minutes
Start Point:	San Angelo Test Facility shop



SECTION 7

OWNER'S MANUAL PAGES

yourself" section.)

⚠ CAUTION

Running the engine with the engine oil pressure warning light on could cause serious damage to the engine almost immediately. Such damage is not covered by warranty. Turn off the engine as soon as it is safe to do so.

KEY Intelligent Key system warning light (if so equipped)

This light illuminates in green when it is possible to turn the ignition switch.

When the light illuminates in red, it is not possible to turn the ignition switch.

- The warning light blinks in red when the Intelligent Key is outside the vehicle with the ignition switch in the ACC or ON position. Confirm the location of the key as soon as possible when the warning light blinks in red. Be sure to carry the Intelligent Key with you while driving the vehicle.
- The warning light turns off about 10 seconds after the Intelligent Key is brought inside the vehicle.

See "INTELLIGENT KEY SYSTEM" in the "3. Pre-driving checks and adjustments" section.

Low fuel warning light

This light illuminates when the fuel in the tank is getting low. Refuel as soon as it is convenient, preferably before the fuel gauge reaches the E (Empty) position.

There will be a small reserve of fuel remaining in the tank when the fuel gauge reaches E.

Low tire pressure warning light

Your vehicle is equipped with a Tire Pressure Monitoring System (TPMS) that monitors the tire pressure of all tires except the spare.

The low tire pressure warning light warns of low tire pressure or indicates that the TPMS is not functioning properly.

After the ignition switch is turned ON, this light illuminates for about 1 second and turns off.

Low tire pressure warning:

If the vehicle is being driven with low tire pressure, the warning light will illuminate.

When the low tire pressure warning light illuminates, you should stop and adjust the tire pressure to the recommended COLD tire pressure shown on the Tire and Loading Information label. The low tire pressure warning light does not automatically turn off when the tire pressure is adjusted. After the tire is inflated to the recommended pressure, the vehicle must be driven at speeds above 16 MPH (25 km/h) to activate the TPMS and turn off the low tire pressure warning light. Use a tire pressure gauge to check the tire pressure.

For additional information, see "TIRE PRESSURE MONITORING SYSTEM (TPMS)" in the "5. Starting and driving" section and "TIRE PRESSURE MONITORING SYSTEM (TPMS)" in the "6. In case of emergency" section.

TPMS malfunction:

If the TPMS is not functioning properly, the low tire pressure warning light will flash for approximately 1 minute when the ignition switch is turned ON. The light will remain on after 1 minute. Have the system checked by a NISSAN dealer.

For additional information, see "TIRE PRESSURE MONITORING SYSTEM (TPMS)" in the "5. Starting and driving" section.

⚠ WARNING

- **If the light does not illuminate with the ignition switch turned ON, have**

⚠ WARNING

- **The exhaust gas and the exhaust system are very hot. Keep people, animals or flammable materials away from the exhaust system components.**
- **Do not stop or park the vehicle over flammable materials such as dry grass, waste paper or rags. They may ignite and cause a fire.**

⚠ CAUTION

- **Do not use leaded gasoline. Deposits from leaded gasoline will seriously reduce the three-way catalyst's ability to help reduce exhaust pollutants.**
- **Keep your engine tuned up. Malfunctions in the ignition, fuel injection, or electrical systems can cause overrich fuel flow into the three-way catalyst, causing it to overheat. Do not keep driving if the engine misfires, or if noticeable loss of performance or other unusual operating conditions are detected. Have the vehicle inspected promptly by a NISSAN dealer.**
- **Avoid driving with an extremely low fuel level. Running out of fuel could cause the engine to misfire, damaging the three-way catalyst.**
- **Do not race the engine while warming it up.**
- **Do not push or tow your vehicle to start the engine.**

TIRE PRESSURE MONITORING SYSTEM (TPMS)

Each tire, including the spare (if provided), should be checked monthly when cold and inflated to the inflation pressure recommended by the vehicle manufacturer on the vehicle placard or tire inflation pressure label. (If your vehicle has tires of a different size than the size indicated on the vehicle placard or tire inflation pressure label, you should determine the proper tire inflation pressure for those tires.)

As an added safety feature, your vehicle has been equipped with a Tire Pressure Monitoring System (TPMS) that illuminates a low tire pressure telltale when one or more of your tires is significantly under-inflated. Accordingly, when the low tire pressure telltale illuminates, you should stop and check your tires as soon as possible, and inflate them to the proper pressure. Driving on a significantly under-inflated tire causes the tire to overheat and can lead to tire failure. Under-inflation also reduces fuel efficiency and tire tread life, and may affect the vehicle's handling and stopping ability.

Please note that the TPMS is not a substitute for proper tire maintenance, and it is the driver's responsibility to maintain correct tire pressure, even if under-inflation has not reached the level to trigger illumination of the TPMS low tire pressure telltale.

Your vehicle has also been equipped with a TPMS malfunction indicator to indicate when the system is not operating properly. The TPMS malfunction indicator is combined with the low tire pressure telltale. When the system detects a malfunction, the telltale will flash for approximately one minute and then remain continuously illuminated. This sequence will continue upon subsequent vehicle start-ups as long as the malfunction exists. When the malfunction indicator is illuminated, the system may not be able to detect or signal low tire pressure as intended. TPMS malfunctions may occur for a variety of reasons, including the installation of replacement or alternate tires or wheels on the vehicle that prevent the TPMS from functioning properly. Always check the TPMS malfunction telltale after replacing one or more tires or wheels on your vehicle to ensure that the replacement or

alternate tires and wheels allow the TPMS to continue to function properly.

Additional information

- The TPMS does not monitor the tire pressure of the spare tire.
- The TPMS will activate only when the vehicle is driven at speeds above 16 MPH (25 km/h). Also, this system may not detect a sudden drop in tire pressure (for example a flat tire while driving).
- The low tire pressure warning light does not automatically turn off when the tire pressure is adjusted. After the tire is inflated to the recommended pressure, the vehicle must be driven at speeds above 16 MPH (25 km/h) to activate the TPMS and turn off the low tire pressure warning light. Use a tire pressure gauge to check the tire pressure.
- Tire pressure rises and falls depending on the heat caused by the vehicle's operation and the outside temperature. Low outside temperature can lower the temperature of the air inside the tire which can cause a lower tire inflation pressure. This may cause the low tire pressure warning light to illuminate. If the warning light illuminates in low ambient temperature, check the tire pressure for all four tires.

For additional information, see "Low tire pressure warning light" in the "2. Instruments and controls" section and "TIRE PRESSURE MONITORING SYSTEM (TPMS)" in the "6. In case of emergency" section.

⚠ WARNING

- **If the low tire pressure warning light illuminates while driving, avoid sudden steering maneuvers or abrupt braking, reduce vehicle speed, pull off the road to a safe location and stop the vehicle as soon as possible. Driving with under-inflated tires may permanently damage the tires and increase the likelihood of tire failure. Serious vehicle damage could occur and may lead to an accident and could result in serious personal injury. Check the tire pressure for all four tires. Adjust the tire pressure to the recommended COLD tire pressure shown on the Tire and Loading Information label to turn the low tire pressure warning light OFF. If you have a flat tire, replace it with a spare tire as soon as possible. (See "FLAT TIRE" in the "6. In case of emergency" section for changing a flat tire.)**
- **When a spare tire is mounted or a wheel is replaced, the TPMS will not function and the low tire pressure warning light will flash for approximately 1 minute. The light will remain on after 1 minute. Contact your NISSAN dealer as soon as possible for tire replacement and/or system resetting.**
- **Replacing tires with those not originally specified by NISSAN could affect the proper operation of the TPMS.**
- **Do not inject any tire liquid or aerosol tire sealant into the tires, as this may cause a malfunction of the tire pressure sensors.**

⚠ CAUTION

- **The TPMS may not function properly when the wheels are equipped with tire chains or the wheels are buried in snow.**
- **Do not place metalized film or any metal parts (antenna, etc.) on the windows. This may cause poor reception of the signals from the tire**

TIRE PRESSURE MONITORING SYSTEM (TPMS)

This vehicle is equipped with the Tire Pressure Monitoring System (TPMS). It monitors tire pressure of all tires except the spare. When the low tire pressure warning light is lit, one or more of your tires is significantly under-inflated. If the vehicle is being driven with low tire pressure, the TPMS will activate and warn you of it by the low tire pressure warning light. This system will activate only when the vehicle is driven at speeds above 16 MPH (25 km/h). For more details, see "WARNING/INDICATOR LIGHTS AND AUDIBLE REMINDERS" in the "2. Instruments and controls" section and "TIRE PRESSURE MONITORING SYSTEM (TPMS)" in the "5. Starting and driving" section.

⚠ WARNING

- **If the low tire pressure warning light illuminates while driving, avoid sudden steering maneuvers or abrupt braking, reduce vehicle speed, pull off the road to a safe location and stop the vehicle as soon as possible. Driving with under-inflated tires may permanently damage the tires and increase the likelihood of tire failure. Serious vehicle damage could occur and may lead to an accident and could result in serious personal injury. Check the tire pressure for all four tires. Adjust the tire pressure to the recommended COLD tire pressure shown on the Tire and Loading Information label to turn the low tire pressure warning light OFF. If you have a flat tire, replace it with a spare tire as soon as possible.**
- **When a spare tire is mounted or a wheel is replaced, the TPMS will not function and the low tire pressure warning light will flash for approximately 1 minute. The light will remain on after 1 minute. Contact your NISSAN dealer as soon as possible for tire replacement and/or system resetting.**
- **Replacing tires with those not originally specified by NISSAN could affect the proper operation of the TPMS.**
- **Do not inject any tire liquid or aerosol tire sealant into the tires, as this may cause a malfunction of the tire pressure sensors.**

CHANGING A FLAT TIRE

If you have a flat tire, follow the instructions below.

Stopping the vehicle

1. Safely move the vehicle off the road and away from traffic.
2. Turn on the hazard warning flashers.
3. Park on a level surface and apply the parking brake. Move the selector lever to the P (Park) position.
4. Turn off the engine.
5. Raise the hood to warn other traffic, and to signal professional road assistance personnel that you need assistance.
6. Have all passengers get out of the vehicle and stand in a safe place, away from traffic and clear of the vehicle.

⚠ WARNING

- **Make sure the parking brake is securely applied and the transmission is shifted into the P (Park) position.**
- **Never change tires when the vehicle is on a slope, ice or slippery areas. This is hazardous.**