REPORT NUMBER 138-STF-09-005

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

CHRYSLER LLC
2009 DODGE JOURNEY
FOUR-DOOR MPV
NHTSA NO. C90302

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

May 19, 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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16. Abstract Compliance tests were conducted on the subject 2009 Dodge Journey four-door MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No.TP-138-03 for the determination of FMVSS 138 compliance. Test failures identified were as follows: NONE.		
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TABLE OF CONTENTS

SECTION 1

INTRODUCTION

1.1 PURPOSE OF COMPLIANCE TEST

A 2009 Dodge Journey 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 Dodge Journey four-door MPV. Nomenclatures applicable to the test vehicle are:

A. Vehicle Identification Number: 3D4GG47B19T223594

B. NHTSA Number: C90302

C Manufacturer: Chrysler, LLC

D. Manufacture Date: 06/2008

1.3 TEST DATE

The test vehicle was tested during the time period March 30 through April 7, 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 driven if necessary, to ensure low tire pressure telltale illumination.
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 driven if necessary, to ensure low tire pressure telltale extinguishment.

One malfunction scenario was performed on the Dodge Journey. The 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.

2.2 SUMMARY OF RESULTS

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

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

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

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

In this scenario, 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: March 30 – April 7, 2009 LAB: U. S. DOT San Angelo Test Facility

VIN: 3D4GG47B19T223594 VEHICLE NHTSA NUMBER: C90302

CERTIFICATION LABEL BUILD DATE: 06/2008

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: March 30, 2009 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302 VIN: 3D4GG47B19T223594

CERTIFICATION LABEL BUILD DATE: 06/2008 ENGINE: 2.4 liter 4 cylinder

MY/MAKE/MODEL/BODY STYLE: 2009 Dodge Journey four-door MPV

TIRE CONDITIONING:

(X) Tires used more than 100 km. Actual odometer reading : 222 km (138 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: TPMS Supplier: Continental Corporation

Sensor: Chrysler P/N 56053031AD (Siemens VDO)

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

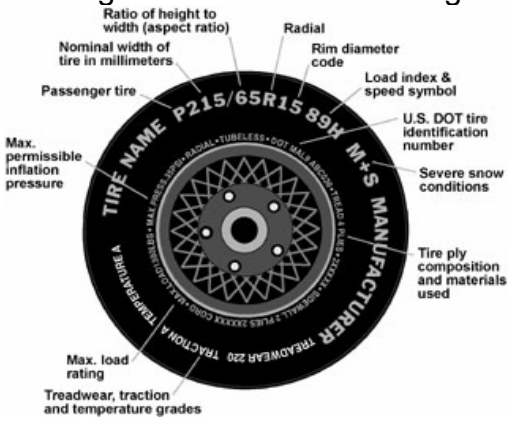
DATA SHEET 1 (Sheet 2 of 3)
TEST PREPARATION INFORMATION

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

Axle	Tire Size	Recommended Cold Inflation Pressure	Source
Front	P225/70R16	220 kPa (32 psi)	Vehicle placard
Rear	P225/70R16	220 kPa (32 psi)	Vehicle placard

INSTALLED TIRE DATA

Diagram - MPV Tire Labeling



Front and Rear Axles

Tire Size and Load Index / Speed Rating: P225/70R16 101T

Manufacturer/Tire Name: Hankook DynaPro HP

Sidewall Max Load Rating: 825 kg (1,819 lbs)

Max Inflation Pressure: 300 kPa (44 psi)

Sidewall Construction (number of plies and ply material): 2 polyester

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

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	220 kPa x .75 = 165 kPa	220 kPa x .75 = 165 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)	165 kPa (24 psi)	165 kPa (24 psi)
(D) Pressure at which to deflate tire(s) = (C) – 7 kPa	158 kPa (23 psi)	158 kPa (23 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: Jack R. Stewart DATE: March 30, 2009

APPROVED BY: Kenneth H. Yates

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

TEST DATE: March 30, 2009 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302

TPMS Low Tire Pressure Warning Telltale

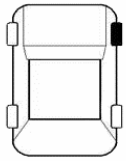
Telltale is mounted inside the occupant compartment in front of and in clear view of the driver?

(X)YES ( )NO (fail)

TPMS Low Tire Pressure Warning Telltale Location: Below the speedometer

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

Note any words or additional symbols used: None

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:

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

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

Time telltale remains illuminated 3.5 seconds.

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: Jack R. Stewart DATE: March 30, 2009

APPROVED BY: Kenneth H. Yates

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

TEST DATE: April 2, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302

Time:	Start:	10:25 am	End:	11:15 am
Ambient Temperature:	Start:	13.6°C (56.5°F)	End:	13.8°C (56.8°F)
Odometer Reading:	Start:	222 km (138 mi)		
Fuel Level:	Start:	Full		
Weather Conditions:		Clear and windy		

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

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	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)
Tire Sidewall Temp	14.8°C (58.6°F)	14.8°C (58.6°F)	14.6°C (58.3°F)	14.4°C (57.9°F)

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

VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: 2,271 kg (5,005 lbs)

GAWR (front): 1,248 kg (2,750 lbs)

GAWR (rear): 1,316 kg (2,900 lbs)

Vehicle Capacity Weight:

Vehicle Capacity Weight 408 kg (900 lbs)

Measured Unloaded Vehicle Weight:

LF	506 kg (1,116 lbs)	LR	377 kg (832 lbs)
RF	469 kg (1,034 lbs)	RR	377 kg (832 lbs)
Front Axle	975 kg (2,150 lbs)	Rear Axle	754 kg (1,664 lbs)

Total Vehicle 1,729 kg (3,814 lbs)

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

LF	558 kg (1,231 lbs)		LR	425 kg (936 lbs)	
RF	524 kg (1,156 lbs)		RR	429 kg (945 lbs)	
Front Axle	1,082 kg (2,387 lbs)	(≤ GAWR)	Rear Axle	854 kg (1,881 lbs)	(≤ GAWR)

Total Vehicle 1,936 kg (4,268 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), 206 kg (454 lbs) of driver, passenger, and test equipment.

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

SCENARIO A – Left Rear Tire Deflation at LLVW

TEST DATE: April 2, 2009 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302

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: 13.8°C (56.8°F) Vehicle cool down period: overnight				
Inflation Pressure	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)
Tire Sidewall Temp	14.8°C (58.6°F)	14.8°C (58.6°F)	14.6°C (58.3°F)	14.4°C (57.9°F)
San Angelo Test Facility Shop Floor Temp	16.4°C (61.5°F)	16.6°C (61.9°F)	15.8°C (60.4°F)	15.6°C (60.1°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	16:28:45 UTC	End:	16:53:36 UTC
Trip Odometer Reading:	Start:	224.2 km (139.3 mi)	End:	256.2 km (159.2 mi)
Ambient Temperature:	Start:	13.8°C (56.8°F)	End:	14.7°C (58.5°F)
Roadway Temperature:	Start:	24.0°C (75.2°F)	End:	26.6°C (79.9°F)

Driving in first direction:

Starting point: Goodfellow Air Force Base (GAFB) north gate Direction: see chart, page 58

10:11 minutes (stopwatch time) 15.9 km (9.9 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 58

10:17 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 98.4 km/h (61.1 mph)

Total Driving Time: 20:28 minutes (VBox time)

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

SCENARIO A – Left Rear 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	242.0 kPa (35.1 psi)	239.1 kPa (34.7 psi)	239.0 kPa (34.7 psi)	242.8 kPa (35.2 psi)
Tire Sidewall Temp	27.0°C (80.6°F)	25.4°C (77.7°F)	23.2°C (73.8°F)	26.8°C (80.2°F)
San Angelo Test Facility Shop Floor Temp	17.2°C (63.0°F)	17.2°C (63.0°F)	16.4°C (61.5°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 ( )RR ( )RF Inflation Pressure		158.0 kPa (22.9 psi)		

TELLTALE ILLUMINATION:

Time to Illuminate:

Illumination in 10 seconds. Driving was not required.

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 – Left Rear 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: 17.0°C (62.6°F) Vehicle cool down period: 60 minutes				
Inflation Pressure	226.5 kPa (32.9 psi)	149.9 kPa (21.7 psi)	224.1 kPa (32.5 psi)	226.9 kPa (32.9 psi)
Tire Sidewall Temp	18.8°C (65.8°F)	18.6°C (65.5°F)	18.0°C (64.4°F)	18.4°C (65.1°F)
San Angelo Test Facility Shop Floor Temp	18.0°C (64.4°F)	18.4°C (65.1°F)	17.6°C (63.7°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:	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 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 rear tire was deflated at LLVW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 2, 2009

APPROVED BY: Kenneth H. Yates

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

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

TEST DATE: April 2, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302

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: 18.9°C (66.0°F) Vehicle cool down period: 60 minutes				
Inflation Pressure	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)
Tire Sidewall Temp	19.0°C (66.2°F)	19.2°C (66.6°F)	19.0°C (66.2°F)	18.2°C (64.8°F)
San Angelo Test Facility Shop Floor Temp	17.8°C (64.0°F)	18.8°C (65.8°F)	17.4°C (63.3°F)	17.6°C (63.7°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	19:22:39 UTC	End:	19:47:08 UTC
Trip Odometer Reading:	Start:	257.7 km (160.1 mi)	End:	289.5 km (179.9 mi)
Ambient Temperature:	Start:	18.9°C (66.0°F)	End:	19.8°C (67.6°F)
Roadway Temperature:	Start:	34.4°C (93.9°F)	End:	35.4°C (95.7°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 59

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 59

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

Max speed: 99.2 km/h (61.6 mph)

Total Driving Time: 20:33 minutes (VBox time)

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

SCENARIO B – Right Rear 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	242.0 kPa (35.1 psi)	239.3 kPa (34.7 psi)	240.0 kPa (34.8 psi)	243.3 kPa (35.3 psi)
Tire Sidewall Temp	30.6°C (87.1°F)	29.2°C (84.6°F)	29.4°C (84.9°F)	31.4°C (88.5°F)
San Angelo Test Facility Shop Floor Temp	18.4°C (65.1°F)	18.8°C (65.8°F)	18.4°C (65.1°F)	18.2°C (64.8°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: ( )LF ( )LR (X)RR (X)RF Inflation Pressure			158.0 kPa (22.9 psi)	158.0 kPa (22.9 psi)

TELLTALE ILLUMINATION:

Driving in first direction:

Time to Illuminate:

Illumination in 10 seconds. Driving was not required.

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 – Right Rear 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: 20.8°C (69.4°F) Vehicle cool down period: 60 minutes				
Inflation Pressure	225.3 kPa (32.7 psi)	224.3 kPa (32.5 psi)	148.5 kPa (21.5 psi)	148.3 kPa (21.5 psi)
Tire Sidewall Temp	21.2°C (70.2°F)	21.4°C (70.5°F)	21.6°C (70.9°F)	20.8°C (69.4°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)	19.4°C (66.9°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:	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)

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

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

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 2, 2009

APPROVED BY: Kenneth H. Yates

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

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

TEST DATE: April 3, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302

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: 7.8°C (46.0°F) Vehicle cool down period: overnight				
Inflation Pressure	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)
Tire Sidewall Temp	12.6°C (54.7°F)	12.2°C (54.0°F)	11.6°C (52.9°F)	12.6°C (54.7°F)
San Angelo Test Facility Shop Floor Temp	15.6°C (60.1°F)	15.6°C (60.1°F)	15.4°C (59.7°F)	15.4°C (59.7°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	13:18:46 UTC	End:	13:44:13 UTC
Trip Odometer Reading:	Start:	291.6 km (181.2 mi)	End:	323.6 km (201.1 mi)
Ambient Temperature:	Start:	7.8°C (46.0°F)	End:	9.7°C (49.5°F)
Roadway Temperature:	Start:	9.6°C (49.3°F)	End:	12.2°C (54.0°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 60

10:07 minutes (stopwatch time) 15.9 km (9.9 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 60

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

Max speed: 98.1 km/h (61.0 mph)

Total Driving Time: 20:37 minutes (VBox time)

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

SCENARIO C – Left Front, Left Rear, Right Rear 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	239.3 kPa (34.7 psi)	238.3 kPa (34.6 psi)	239.2 kPa (34.7 psi)	241.0 kPa (35.0 psi)
Tire Sidewall Temp	22.6°C (72.7°F)	20.6°C (69.1°F)	19.8°C (67.6°F)	22.4°C (72.3°F)
San Angelo Test Facility Shop Floor Temp	15.2°C (59.4°F)	15.4°C (59.7°F)	14.8°C (58.6°F)	15.2°C (59.4°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 ( )RF Inflation Pressure	158.0 kPa (22.9 psi)	158.0 kPa (22.9 psi)	158.0 kPa (22.9 psi)	

TELLTALE ILLUMINATION:

Time to Illuminate:

Illumination in 10 seconds. Driving was not required.

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 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: 15.4°C (59.7°F) Vehicle cool down period: 62 minutes				
Inflation Pressure	154.0 kPa (22.3 psi)	153.6 kPa (22.3 psi)	152.9 kPa (22.2 psi)	232.0 kPa (33.6 psi)
Tire Sidewall Temp	16.6°C (61.9°F)	16.8°C (62.2°F)	16.4°C (61.5°F)	17.2°C (63.0°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)	16.2°C (61.2°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:	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 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, and right rear tires were deflated at LLVW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 3, 2009

APPROVED BY: Kenneth H. Yates

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

TEST DATE: April 6, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302

Time:	Start:	8:52 am	End:	10:45 am
Ambient Temperature:	Start:	5.6°C (42.1°F)	End:	8.5°C (47.3°F)
Odometer Reading:	Start:	369.7 km (229.7 mi)		
Fuel Level:	Start:	Full		
Weather Conditions:		Partly cloudy, light wind		

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	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)
Tire Sidewall Temp	9.2°C (48.6°F)	8.2°C (46.8°F)	8.4°C (47.1°F)	8.6°C (47.5°F)

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

VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: 2,271 kg (5,005 lbs)

GAWR (front): 1,248 kg (2,750 lbs)

GAWR (rear): 1,316 kg (2,900 lbs)

Vehicle Capacity Weight:

Vehicle Capacity Weight 408 kg (900 lbs)

Measured Unloaded Vehicle Weight:

LF	505 kg (1,114 lbs)	LR	378 kg (834 lbs)
RF	469 kg (1,034 lbs)	RR	377 kg (832 lbs)
Front Axle	974 kg (2,148 lbs)	Rear Axle	755 kg (1,666 lbs)

Total Vehicle 1,729 kg (3,814 lbs)

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

LF	570 kg (1,256 lbs)		LR	514 kg (1,134 lbs)	
RF	540 kg (1,190 lbs)		RR	514 kg (1,134 lbs)	
Front Axle	1,110 kg (2,446 lbs)	(≤ GAWR)	Rear Axle	1,028 kg (2,268 lbs)	(≤ GAWR)

Total Vehicle 2,138 kg (4,714 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 – Right Front Tire Deflation at UVW + VCW

TEST DATE: April 6, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302

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: 9.4°C (48.9°F) Vehicle cool down period: overnight				
Inflation Pressure	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)
Tire Sidewall Temp	12.8°C (55.0°F)	12.2°C (54.0°F)	12.6°C (54.7°F)	11.6°C (52.9°F)
San Angelo Test Facility Shop Floor Temp	14.6°C (58.3°F)	14.6°C (58.3°F)	14.4°C (57.9°F)	13.8°C (56.8°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	16:08:48 UTC	End:	16:33:41 UTC
Trip Odometer Reading:	Start:	370.3 km (230.1 mi)	End:	402.3 km (250.0 mi)
Ambient Temperature:	Start:	9.4°C (48.9°F)	End:	10.3°C (50.5°F)
Roadway Temperature:	Start:	22.6°C (72.7°F)	End:	26.4°C (79.5°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 61

10:13 minutes (stopwatch time) 15.9 km (9.9 mi) distance

Driving in opposite direction:

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

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

Max speed: 98.6 km/h (61.3 mph)

Total Driving Time: 20:44 minutes (VBox time)

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

SCENARIO D – 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	243.4 kPa (35.3 psi)	244.1 kPa (35.4 psi)	243.5 kPa (35.3 psi)	244.7 kPa (35.5 psi)
Tire Sidewall Temp	24.2°C (75.6°F)	23.8°C (74.8°F)	23.2°C (73.8°F)	23.6°C (74.5°F)
San Angelo Test Facility Shop Floor Temp	14.6°C (58.3°F)	14.6°C (58.3°F)	13.8°C (56.8°F)	14.4°C (57.9°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 ( )LR ( )RR (X)RF Inflation Pressure				158.0 kPa (22.9 psi)

TELLTALE ILLUMINATION:

Time to Illuminate:

Illumination in 10 seconds. Driving was not required.

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 – 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: 13.3°C (55.9°F) Vehicle cool down period: 62 minutes				
Inflation Pressure	231.0 kPa (33.5 psi)	228.6 kPa (33.2 psi)	228.1 kPa (33.1 psi)	150.3 kPa (21.8 psi)
Tire Sidewall Temp	16.4°C (61.5°F)	16.4°C (61.5°F)	15.6°C (60.1°F)	16.0°C (60.8°F)
San Angelo Test Facility Shop Floor Temp	16.2°C (61.2°F)	16.0°C (60.8°F)	15.2°C (59.4°F)	15.6°C (60.1°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:	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)

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

TEST RESULTS

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

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 6, 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 6, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302

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: 14.3°C (57.7°F) Vehicle cool down period: 60 minutes				
Inflation Pressure	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)
Tire Sidewall Temp	16.0°C (60.8°F)	16.4°C (61.5°F)	15.8°C (60.4°F)	15.4°C (59.7°F)
San Angelo Test Facility Shop Floor Temp	15.8°C (60.4°F)	15.8°C (60.4°F)	15.4°C (59.7°F)	15.4°C (59.7°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	19:07:36 UTC	End:	19:32:31 UTC
Trip Odometer Reading:	Start:	403.8 km (250.9 mi)	End:	435.8 km (270.8 mi)
Ambient Temperature:	Start:	14.3°C (57.7°F)	End:	15.3°C (59.5°F)
Roadway Temperature:	Start:	33.2°C (91.8°F)	End:	37.4°C (99.3°F)

Driving in first direction:

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

10:13 minutes (stopwatch time) 15.9 km (9.9 mi) distance

Driving in opposite direction:

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

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

Max speed: 98.4 km/h (61.1 mph)

Total Driving Time: 20:40 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	239.7 kPa (34.8 psi)	241.8 kPa (35.1 psi)	242.1 kPa (35.1 psi)	240.3 kPa (34.9 psi)
Tire Sidewall Temp	27.0°C (80.6°F)	27.8°C (82.0°F)	27.2°C (81.0°F)	28.4°C (83.1°F)
San Angelo Test Facility Shop Floor Temp	16.4°C (61.5°F)	16.6°C (61.9°F)	16.6°C (61.9°F)	16.2°C (61.2°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		158.0 kPa (22.9 psi)	158.0 kPa (22.9 psi)	

TELLTALE ILLUMINATION:

Time to Illuminate:

Illumination in 10 seconds. Driving was not required.

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: 17.3°C (63.1°F) Vehicle cool down period: 60 minutes				
Inflation Pressure	226.2 kPa (32.8 psi)	148.9 kPa (21.6 psi)	148.5 kPa (21.5 psi)	226.7 kPa (32.9 psi)
Tire Sidewall Temp	18.8°C (65.8°F)	19.4°C (66.9°F)	18.6°C (65.5°F)	18.8°C (65.8°F)
San Angelo Test Facility Shop Floor Temp	17.4°C (63.3°F)	17.6°C (63.7°F)	17.6°C (63.7°F)	17.2°C (63.0°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:	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 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 rear and right rear tires were deflated at UVW + VCW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 6, 2009

APPROVED BY: Kenneth H. Yates

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

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

TEST DATE: April 7, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302

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: 8.4°C (47.1°F) Vehicle cool down period: overnight				
Inflation Pressure	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)
Tire Sidewall Temp	11.4°C (52.5°F)	10.8°C (51.4°F)	10.8°C (51.4°F)	11.0°C (51.8°F)
San Angelo Test Facility Shop Floor Temp	13.4°C (56.1°F)	13.2°C (55.8°F)	13.0°C (55.4°F)	13.4°C (56.1°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	15:03:07 UTC	End:	15:27:31 UTC
Trip Odometer Reading:	Start:	437.9 km (272.1 mi)	End:	469.8 km (291.9 mi)
Ambient Temperature:	Start:	8.4°C (47.1°F)	End:	11.2°C (52.2°F)
Roadway Temperature:	Start:	13.2°C (55.8°F)	End:	23.2°C (73.8°F)

Driving in first direction:

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

10:12 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

10:31 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 98.5 km/h (61.2 mph)

Total Driving Time: 20:43 minutes (VBox time)

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

SCENARIO F – Left Front, Left Rear, 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	247.1 kPa (35.8 psi)	247.6 kPa (35.9 psi)	248.7 kPa (36.1 psi)	248.2 kPa (36.0 psi)
Tire Sidewall Temp	27.4°C (81.3°F)	26.4°C (79.5°F)	24.4°C (75.9°F)	25.4°C (77.7°F)
San Angelo Test Facility Shop Floor Temp	13.8°C (56.8°F)	13.8°C (56.8°F)	13.6°C (56.5°F)	14.0°C (57.2°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	158.0 kPa (22.9 psi)	158.0 kPa (22.9 psi)	158.0 kPa (22.9 psi)	158.0 kPa (22.9 psi)

TELLTALE ILLUMINATION:

Time to Illuminate:

Illumination in 10 seconds. Driving was not required.

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, Left Rear, 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: 17.1°C (62.8°F) Vehicle cool down period: 61 minutes				
Inflation Pressure	151.0 kPa (21.9 psi)	150.0 kPa (21.8 psi)	149.8 kPa (21.7 psi)	151.2 kPa (21.9 psi)
Tire Sidewall Temp	17.4°C (63.3°F)	17.4°C (63.3°F)	17.6°C (63.7°F)	17.8°C (64.0°F)
San Angelo Test Facility Shop Floor Temp	15.4°C (59.7°F)	15.4°C (59.7°F)	15.4°C (59.7°F)	15.4°C (59.7°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:	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 psi)	220.0 kPa (31.9 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 UVW +VCW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 7, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 4 (Sheet 1 of 2)
Scenario G – Malfunction Detection Test at LLVW

TEST DATE: April 3, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90302

Time:	Start:	15:48:06 UTC	End:	16:09:56 UTC
Trip Odometer Reading:	Start:	324.6 km (201.7 mi)	End:	351.8 km (218.6 mi)
Ambient Temperature:	Start:	18.3°C (64.9°F)	End:	20.3°C (68.5°F)
Roadway Temperature:	Start:	27.8°C (82.0°F)	End:	30.8°C (87.4°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 64

21:50 minutes (stopwatch time – non-cumulative) 27.2 km (16.9 mi) distance

Max speed: 97.9 km/h (60.8 mph)
Total Driving Time: 16:33 minutes (VBox time)

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

DATA SHEET 4 (Sheet 2 of 2)
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	10	seconds
Time telltale remains flashing	75	seconds
Time telltale remains illuminated (Verified for a minimum of 60 seconds)	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

1:00 minute (stopwatch time – non-cumulative) 0.3 km (0.2 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: Jack R. Stewart DATE: April 3, 2009

APPROVED BY: Kenneth H. Yates

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

TEST DATE: March 30, 2009 LAB: San Angelo Test Facility VEHICLE NHTSA NO: C90302

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
- [x] The time for the TPMS telltale(s) to extinguish once the low tire pressure condition or the malfunction is corrected

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: March 30, 2009

APPROVED BY: Kenneth H. Yates

SECTION 4

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

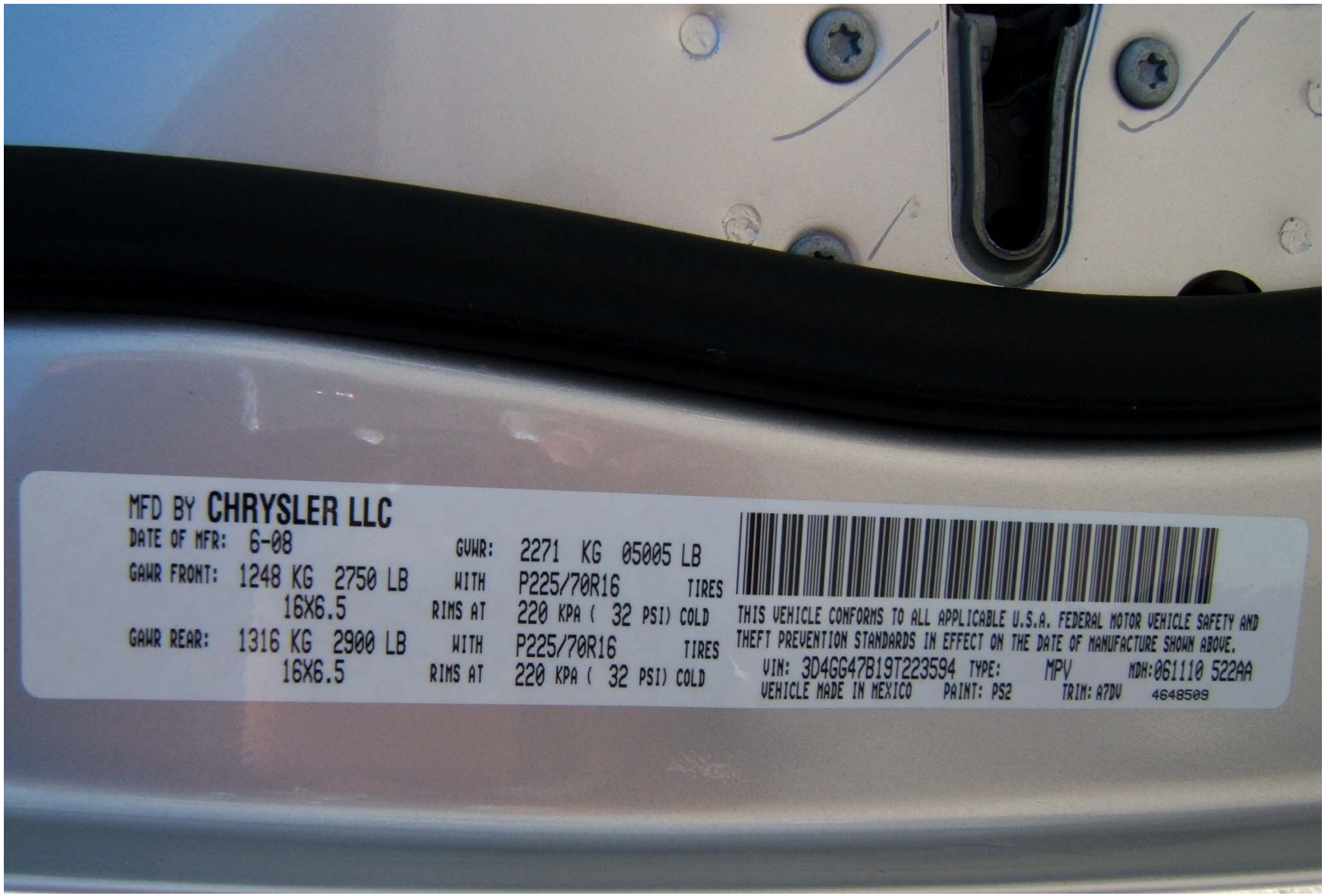
EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO	CAL. DATE	NEXT CAL. DATE
STOPWATCH	WESTCLOX QUARTZ STOPWATCH	NONE	N/A	N/A
VBOX RECORDING DEVICE	RACELOGIC VBOX III	SERIAL # 030209	3/22/2009	3/22/2010
AMBIENT TEMPERATURE GAUGE	FLUKE 179 DIGITAL THERMOMETER	SERIAL #84740316	2/12/2009	2/12/2010
LASER TEMPERATURE GAUGE (TIRES AND GROUND)	RAYTEK MINITEMP MT6 INFRARED THERMOMETER	SERIAL # MAGR000042598	4/11/2008	4/11/2009
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 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO.138

FIGURE 5.1
¾ FRONT VIEW FROM LEFT SIDE OF VEHICLE



2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO.138

FIGURE 5.2
VEHICLE CERTIFICATION LABEL

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

FIGURE 5.3
VEHICLE PLACARD

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

FIGURE 5.4
TIRE SHOWING BRAND

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

FIGURE 5.5
TIRE SHOWING MODEL

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

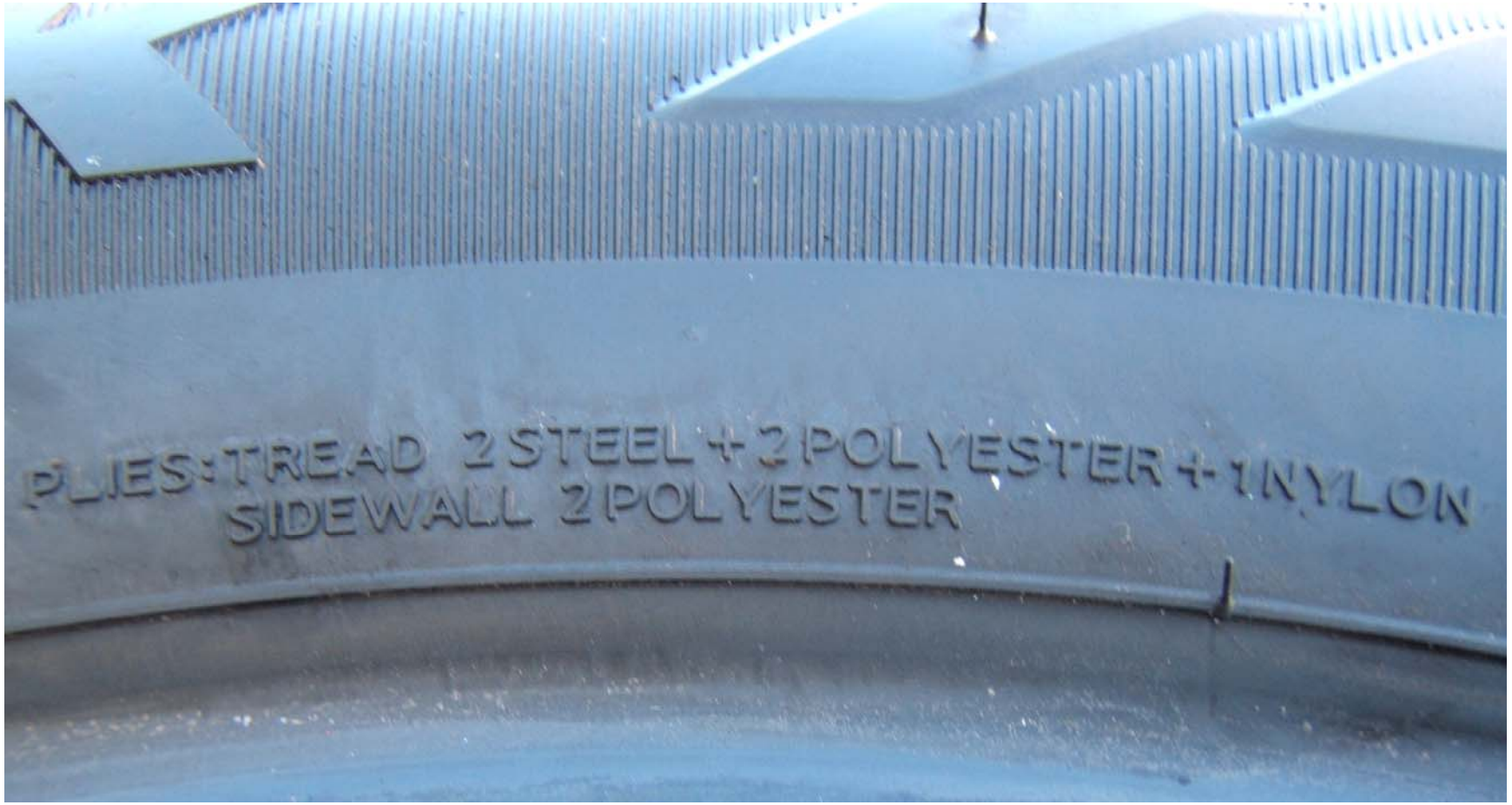
FIGURE 5.6
TIRE SHOWING SIZE AND LOAD INDEX / SPEED RATING

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

FIGURE 5.7
TIRE SHOWING DOT SERIAL NUMBER

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

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



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FMVSS NO. 138

FIGURE 5.9
TIRE SHOWING SIDEWALL / TREAD CONSTRUCTION

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NHTSA NO. C90302
FMVSS NO. 138

FIGURE 5.10
RIM SHOWING TPMS SENSOR

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

FIGURE 5.11
RIM CONTOUR FOR FULL WIDTH OF CROSS SECTION

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

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

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO 138

FIGURE 5.13
TEST INSTRUMENTATION INSTALLED IN VEHICLE

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

FIGURE 5.14
VEHICLE REAR SEAT BALLAST
FOR UVW + VCW LOAD

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

FIGURE 5.15
VEHICLE CARGO AREA BALLAST FOR UVW + VCW LOAD

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

FIGURE 5.16
VEHICLE ON WEIGHT SCALES

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 138

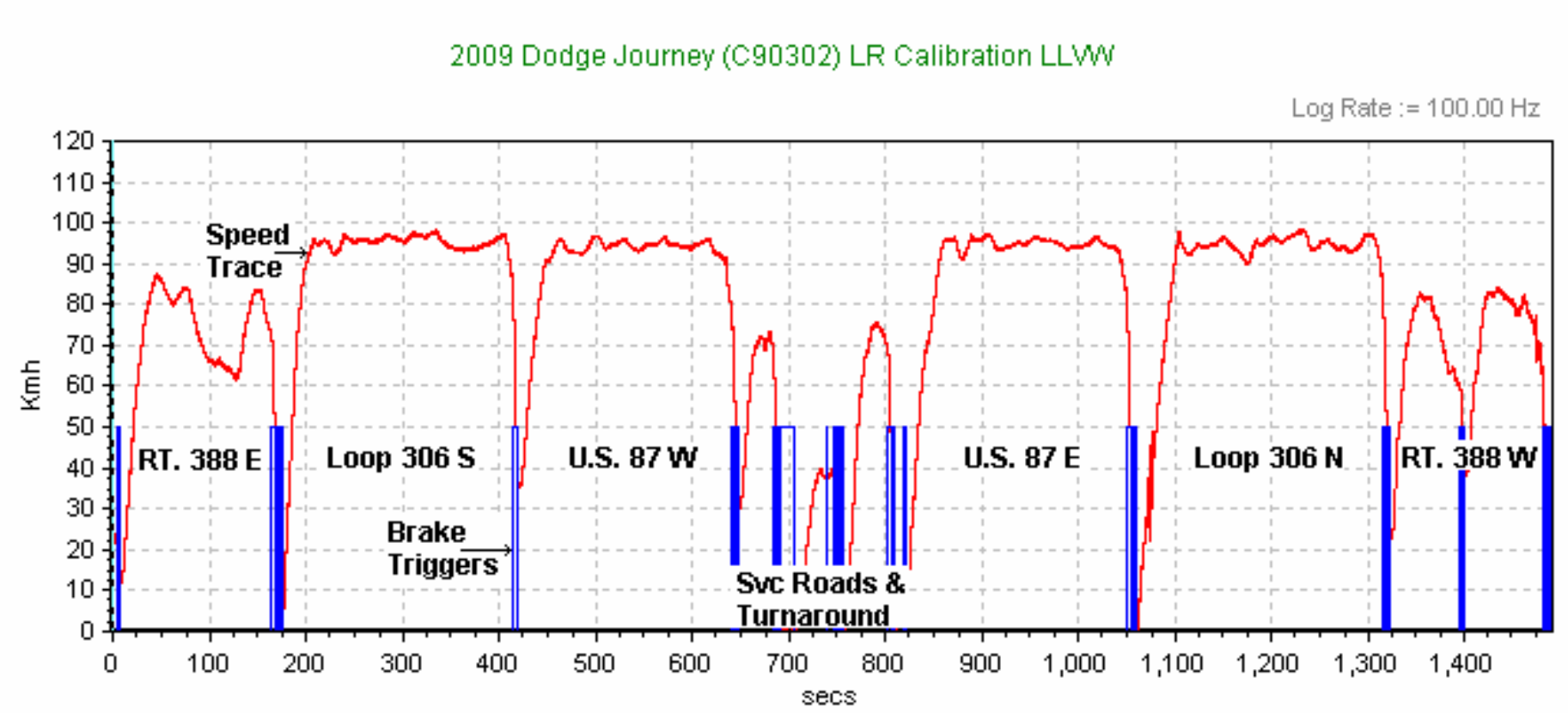
FIGURE 5.17
SPARE INSTALLED ON RIGHT FRONT
FOR MALFUNCTION DETECTION TEST

SECTION 6

TEST PLOTS

Scenario A: Left Rear Tire at LLVW
Test Date: 4/2/09
Data File Time: 24:51 minutes
Cumulative Driving Time: 20:28 minutes
Start Point: GAFB North Gate

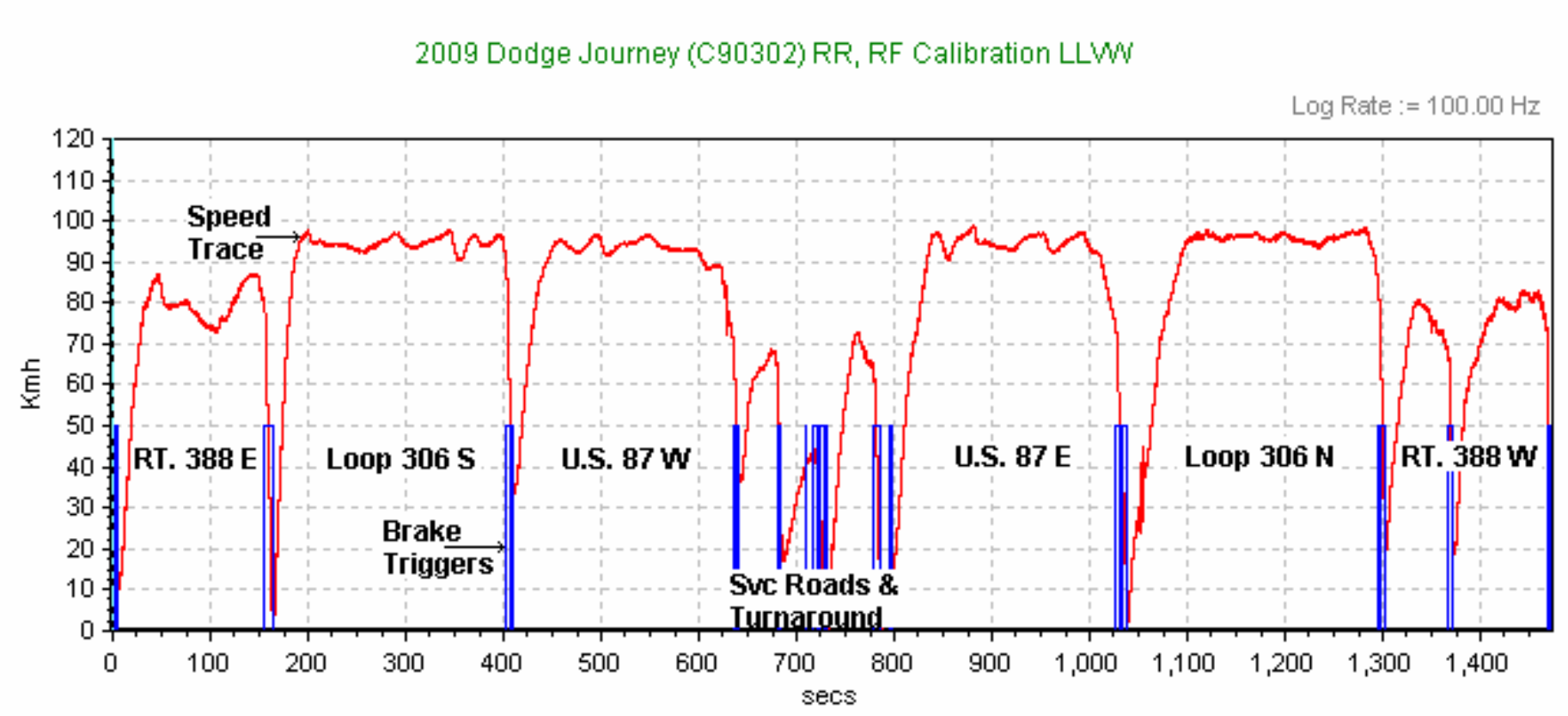
Calibration Phase:



LR Detection Phase: Illumination in 10 seconds. Driving was not required.

Scenario B:	Right Rear, Right Front Tires at LLVW
Test Date:	4/2/09
Data File Time:	24:35 minutes
Cumulative Driving Time:	20:33 minutes
Start Point:	GAFB North Gate

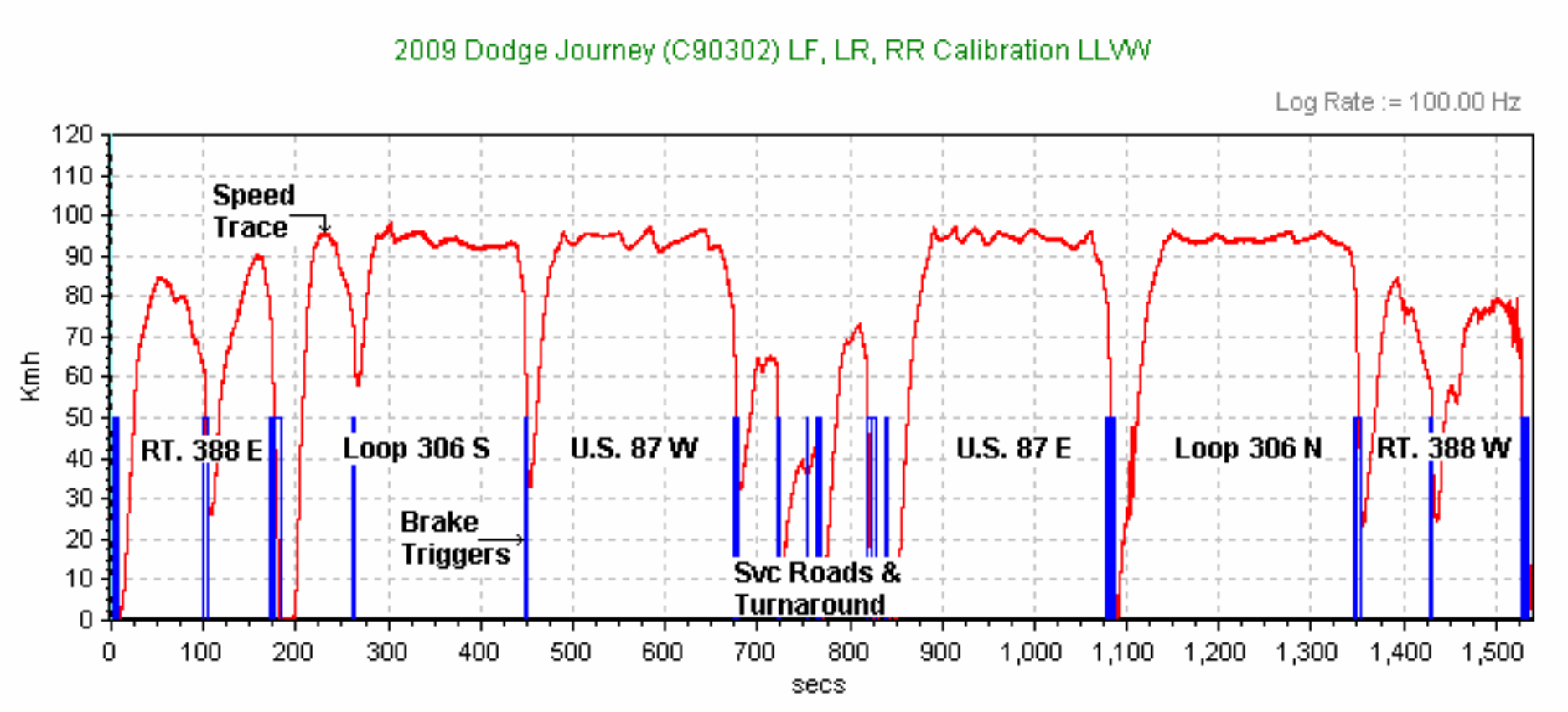
Calibration Phase:



RR, RF Detection Phase: Illumination in 10 seconds. Driving was not required.

Scenario C:	Left Front, Left Rear, Right Rear Tires at LLVW
Test Date:	4/3/09
Data File Time:	25:40 minutes
Cumulative Driving Time:	20:37 minutes
Start Point:	GAFB North Gate

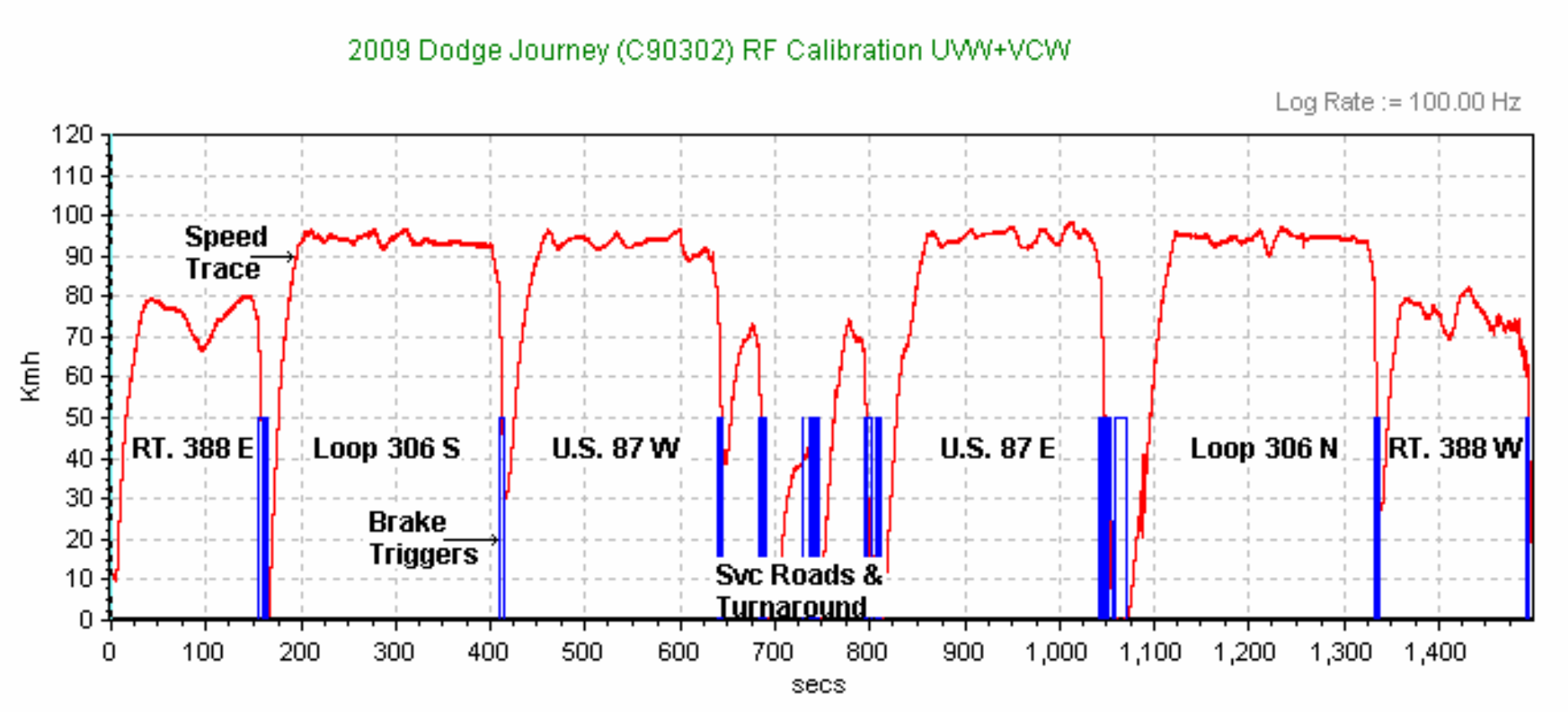
Calibration Phase:



LF, LR, RR Detection Phase: Illumination in 10 seconds. Driving was not required.

Scenario D: Right Front Tire at UVW + VCW
Test Date: 4/6/09
Data File Time: 24:59 minutes
Cumulative Driving Time: 20:44 minutes
Start Point: GAFB North Gate

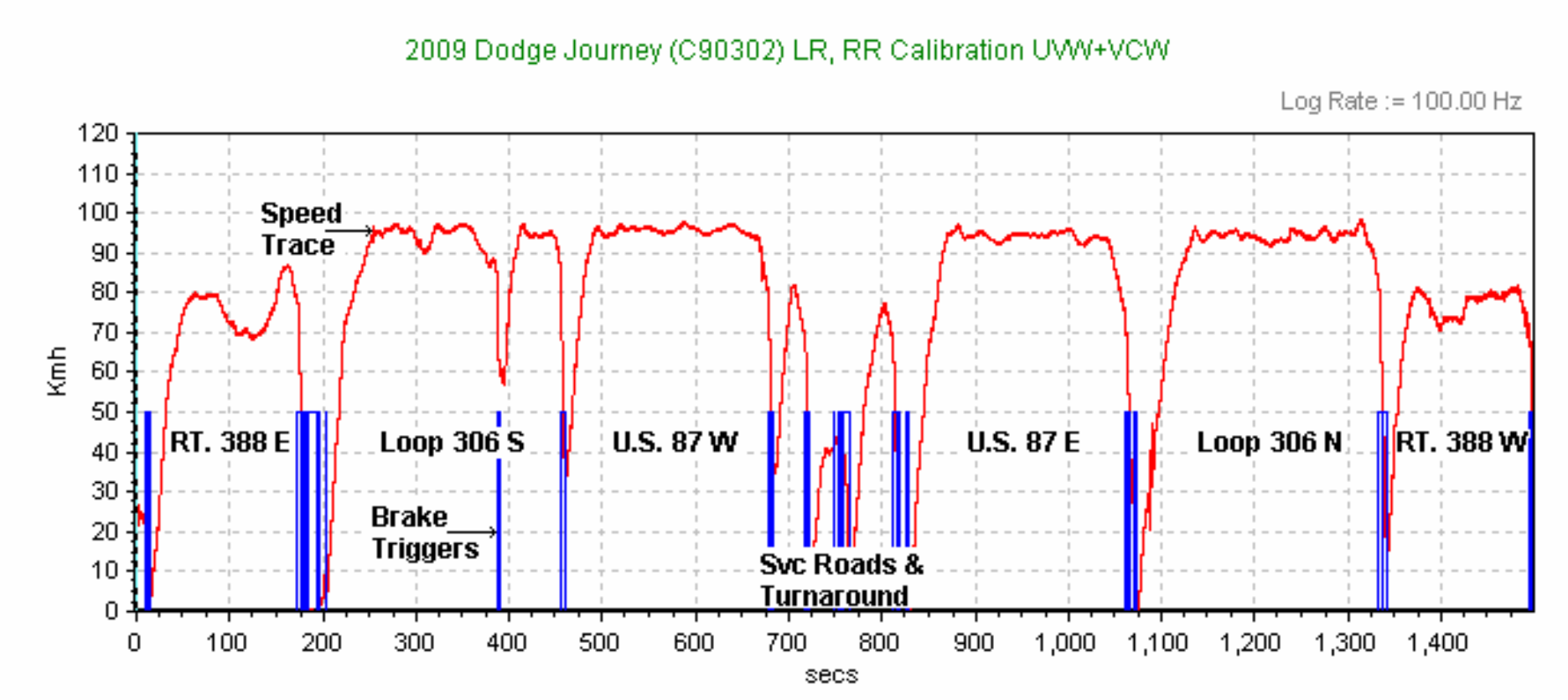
Calibration Phase:



RF Detection Phase: Illumination in 10 seconds. Driving was not required.

Scenario E:	Left Rear, Right Rear Tires at UVW + VCW
Test Date:	4/6/09
Data File Time:	24:59 minutes
Cumulative Driving Time:	20:40 minutes
Start Point:	GAFB North Gate

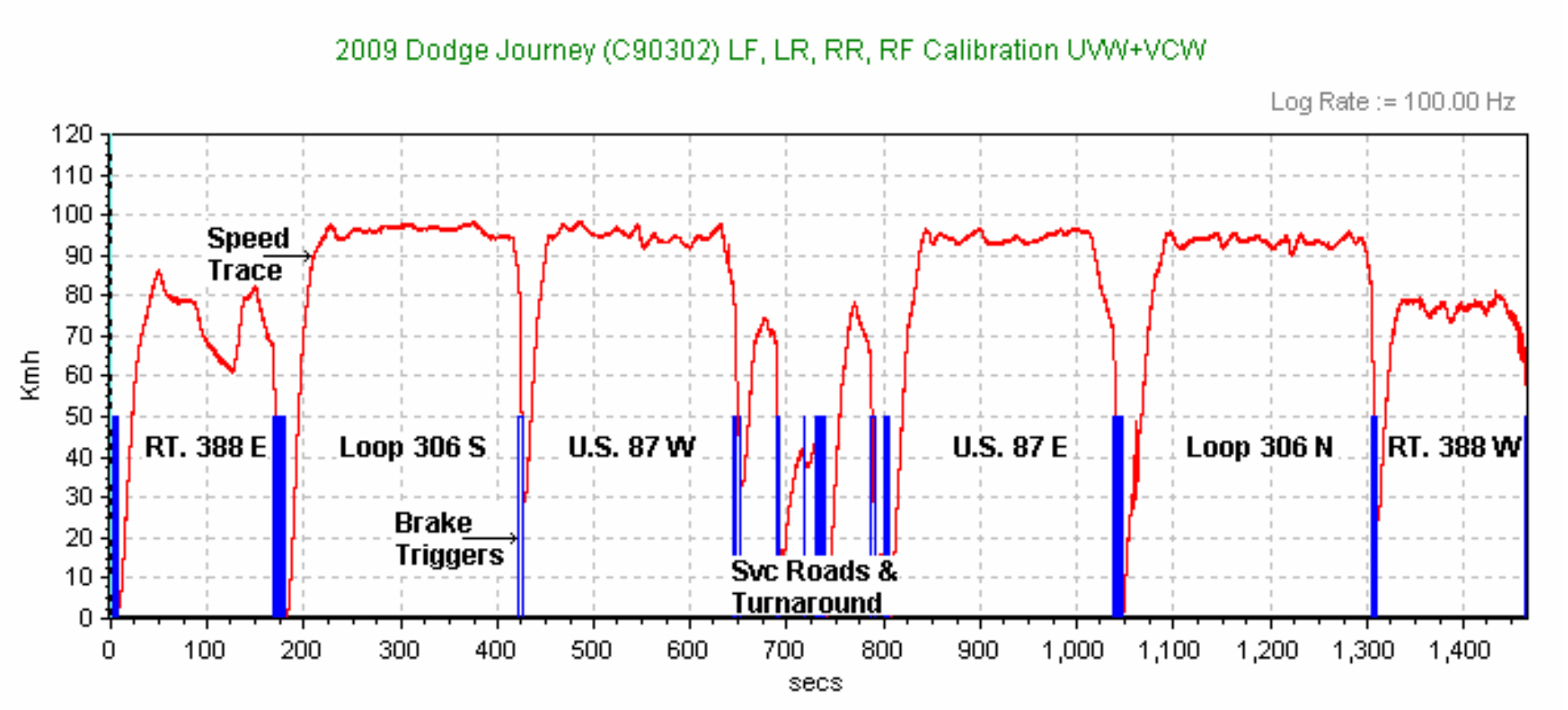
Calibration Phase:



LR, RR Detection Phase: Illumination in 10 seconds. Driving was not required.

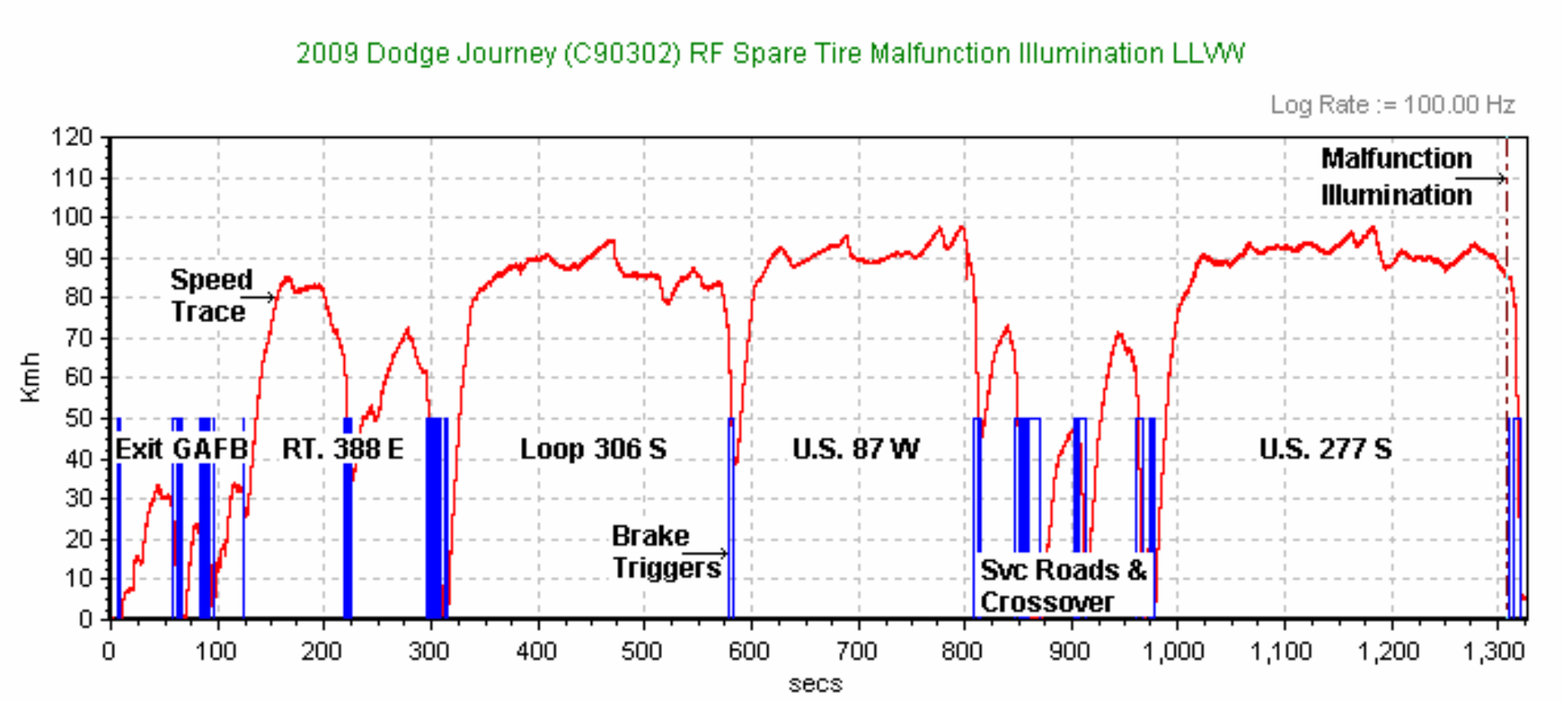
Scenario F:	Left Front, Left Rear, Right Rear, Right Front Tires at UVW + VCW
Test Date:	4/7/09
Data File Time:	24:26 minutes
Cumulative Driving Time:	20:43 minutes
Start Point:	GAFB North Gate

Calibration Phase:



LF, LR, RR, RF Detection Phase: Illumination in 10 seconds. Driving was not required.

Scenario G Malfunction Illumination:	Spare Tire without TPMS Sensor Applied to Right Front at LLVW
Test Date:	4/3/09
Data File Time:	22:07 minutes
Cumulative Driving Time:	16:33 minutes
Start Point:	San Angelo Test Facility shop



SECTION 7

OWNER'S MANUAL PAGES

21. Tire Pressure Monitoring Telltale Light — If Equipped

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 light 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 light 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. (See page 355 for more information.)

CAUTION!

The TPMS has been optimized for the original equipment tires and wheels. TPMS pressures and warning have been established for the tire size equipped on your vehicle. Undesirable system operation or sensor damage may result when using replacement equipment that is not of the same size, type, and/or style. Aftermarket wheels can cause sensor damage. Do not use aftermarket tire sealants or balance beads if your vehicle is equipped with a TPMS, as damage to the sensors may result. (Refer to "Tire Inflation Pressures" under "Tires — General Information" and to "Tire Pressure Monitor System (TPMS)" in Section 5 for more information).

TIRE CHAINS

Due to limited clearance, tire chains are not recommended.

CAUTION!
Damage to the vehicle may result if tire chains are used.

SNOW TIRES

Some areas of the country require the use of snow tires during the winter. Standard tires are of the all season type and satisfy this requirement as indicated by the M+S designation on the tire sidewall.

If you need snow tires, select tires equivalent in size and type to the original equipment tires. Use snow tires only in sets of four. Failure to do so may adversely affect the safety and handling of your vehicle.

Snow tires generally have lower speed ratings than what was originally equipped with your vehicle and should not be operated at sustained speeds over 75 mph (120 km/h).

TIRE PRESSURE MONITOR SYSTEM (TPMS) — IF EQUIPPED

- The Tire Pressure Monitor System (TPMS) will warn the driver of a low tire pressure based on the vehicle recommended cold placard pressure.
- The tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12°F (6.5°C). This means that when the outside temperature decreases, the tire pressure will decrease. Tire pressure should always be set based on cold inflation tire pressure. This is defined as the tire pressure after the vehicle has not been driven for at least three hours, or driven less than 1 mi (1 km) after a three hour period. The cold tire inflation pressure must not exceed the maximum inflation pressure molded into the tire sidewall. Refer to the "Tires – General Information" in this section for information on

how to properly inflate the vehicle's tires. The tire pressure will also increase as the vehicle is driven. This is normal and there should be no adjustment for this increased pressure.

- The TPMS will warn the driver of a low tire pressure if the tire pressure falls below the low-pressure warning limit for any reason, including low temperature effects and natural pressure loss through the tire.
- The TPMS will continue to warn the driver of low tire pressure as long as the condition exists, and will not turn off until the tire pressure is at or above the recommended cold placard pressure. Once the low tire pressure warning (Tire Pressure Monitoring Telltale light) illuminates, you must increase the tire pressure to the recommended cold placard pressure in order for the Tire Pressure Monitoring Telltale light to turn off. The system will automatically update and the Tire Pressure Monitoring Telltale light will turn off once the system receivesthe updated tire pressures. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) in order for the TPMS to receive this information.
  - For example, your vehicle may have a recommended cold (parked for more than three hours) placard pressure of 33 psi (227 kPa). If the ambient temperature is 68°F (20°C) and the measured tire pressure is 28 psi (193 kPa), a temperature drop to 20°F (-7°C) will decrease the tire pressure to approximately 24 psi (165 kPa). This tire pressure is low enough to turn ON the Tire Pressure Monitoring Telltale light. Driving the vehicle may cause the tire pressure to rise to approximately 28 psi (193 kPa), but the Tire Pressure Monitoring Telltale light will still be on. In this situation, the Tire Pressure Monitoring Telltale light will turn off only after the tires are inflated to the vehicle's recommended cold placard pressure value.

CAUTION!

- **The TPMS has been optimized for the original equipment tires and wheels. TPMS pressures and warning have been established for the tire size equipped on your vehicle. Undesirable system operation or sensor damage may result when using replacement equipment that is not of the same size, type, and/or style. Aftermarket wheels can cause sensor damage. Do not use aftermarket tire sealants or balance beads if your vehicle is equipped with a TPMS, as damage to the sensors may result.**
- **After inspecting or adjusting the tire pressure, always reinstall the valve stem cap. This will prevent moisture and dirt from entering the valve stem, which could damage the Tire Pressure Monitoring Sensor.**

NOTE:

- The TPMS is not intended to replace normal tire care and maintenance, or to provide warning of a tire failure or condition.
- The TPMS should not be used as a tire pressure gauge while adjusting your tire 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.
- The TPMS is not a substitute for proper tire maintenance, and it is the driver's responsibility to maintain correct tire pressure using an accurate tire pressure gauge, even if under-inflation has not reached the level to trigger illumination of the Tire Pressure Monitoring Telltale light.

- Seasonal temperature changes will affect tire pressure, and the TPMS will monitor the actual tire pressure in the tire.

Base System — If Equipped

The Tire Pressure Monitor System (TPMS) uses wireless technology with wheel rim mounted electronic sensors to monitor tire pressure levels. Sensors, mounted to each wheel as part of the valve stem, transmit tire pressure readings to the receiver module.

NOTE: It is particularly important for you to check the tire pressure in all of the tires on your vehicle monthly and to maintain the proper pressure.

The TPMS consists of the following components:

- Receiver Module
- Four Tire Pressure Monitoring Sensors
- Tire Pressure Monitoring Telltale light

Tire Pressure Monitoring Low Pressure Warnings

The Tire Pressure Monitoring Telltale light will illuminate in the instrument cluster and a chime will sound when tire pressure is low in one or more of the four active road tires. Should this occur, you should stop as soon as possible, check the inflation pressure of each tire on your vehicle, and inflate each tire to the vehicle's recommended cold placard pressure value. Once the system receives the updated tire pressures, the system will automatically update and the Tire Pressure Monitoring Telltale light will turn off. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) in order for the TPMS to receive this information.

Check TPMS Warning

When a system fault is detected, the Tire Pressure Monitoring Telltale light will flash on and off for 75 seconds and then remain on solid. The system fault will also sound a chime. If the ignition key is cycled, this sequence

will repeat, providing the system fault still exists. The Tire Pressure Monitoring Telltale light will turn off when the fault condition no longer exists. A system fault can occur due to any of the following:

1. Jamming due to electronic devices or driving next to facilities emitting the same Radio Frequencies as the TPMS sensors.

2. Installing some form of aftermarket window tinting that affects radio wave signals.

3. Lots of snow or ice around the wheels or wheel housings.

4. Using tire chains on the vehicle.

5. Using wheels/tires not equipped with TPMS sensors.

NOTE:

1. The compact spare tire does not have a tire pressure monitoring sensor. Therefore, the TPMS will not monitor the pressure in the compact spare tire.

2. If you install the compact spare tire in place of a road tire that has a pressure below the low-pressure warning limit, a chime will sound and the TPMS Telltale light will turn on upon the next ignition key cycle.

3. After driving the vehicle for up to 10 minutes above 15 mph (25 km/h), the TPMS Telltale light will flash on and off for 75 seconds and then remain on solid.

4. For each subsequent ignition key cycle, a chime will sound and the TPMS Telltale light will flash on and off for 75 seconds and then remain on solid.

5. Once you repair or replace the original road tire and reinstall it on the vehicle in place of the compact spare, the TPMS will update automatically and the TPMS Telltale light will turn off, as long as no tire pressure is below the low-pressure warning limit in any of the four active road tires. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) in order for the TPMS to receive this information.

Premium System — If Equipped

The Tire Pressure Monitor System (TPMS) uses wireless technology with wheel rim mounted electronic sensors to monitor tire pressure levels. Sensors, mounted to each wheel as part of the valve stem, transmit tire pressure readings to the receiver module.

NOTE: It is particularly important for you to check the tire pressure in all of the tires on your vehicle monthly and to maintain the proper pressure.

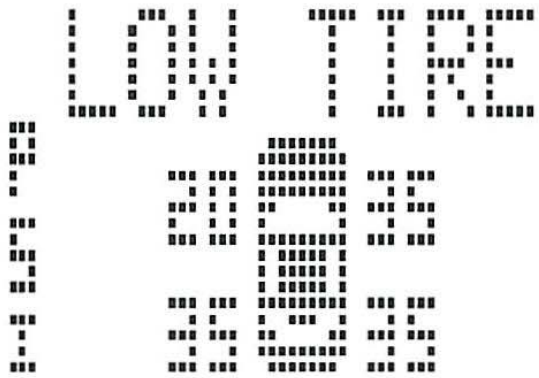
The TPMS consists of the following components:

- Receiver module
- Four Tire Pressure Monitoring Sensors
- Three Trigger modules (mounted in three of the four wheel-wells)
- Various Tire Pressure Monitoring System messages, which display in the Electronic Vehicle Information Center (EVIC)
- Tire Pressure Monitoring Telltale light

Tire Pressure Monitoring Low Pressure Warnings

The Tire Pressure Monitoring Telltale light will illuminate in the instrument cluster and a chime will sound when tire pressure is low in one or more of the four active road tires. In addition, the

Electronic Vehicle Information Center (EVIC) will display a graphic showing the pressure values of each tire with the low tire pressure values flashing.



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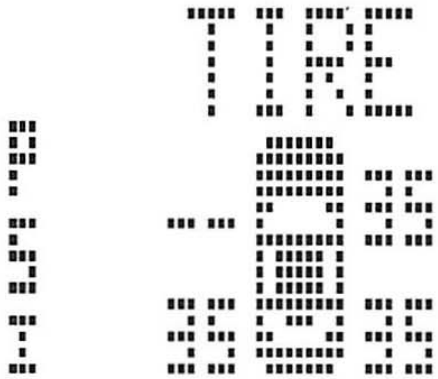
Should this occur, you should stop as soon as possible and inflate the tires with low pressure (those flashing in the EVIC graphic) to the vehicle's recommended cold placard pressure value. Once the system receives the updated tire pressures, the system will automatically update, the graphic display in the EVIC will stop flashing, and the Tire Pressure Monitoring Telltale light will turn off. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) in order for the TPMS to receive this information.

Check TPMS Warning

When a system fault is detected, the Tire Pressure Monitoring Telltale light will flash on and off for 75 seconds and then remain on solid. The system fault will also sound a chime. In addition, the EVIC will display a "CHECK TPM SYSTEM" message for three seconds and then display dashes (- -) in place of the pressure value to indicate which sensor is not being received.



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If the ignition key is cycled, this sequence will repeat, providing the system fault still exists. If the system fault no longer exists, the Tire Pressure Monitoring Telltale light will no longer flash, and the "CHECK TPM SYSTEM" message will no longer display, and a pressure value will display in place of the dashes. A system fault can occur due to any of the following:

1. Jamming due to electronic devices or driving next to facilities emitting the same radio frequencies as the TPMS sensors.

2. Installing some form of aftermarket window tinting that affects radio wave signals.

3. Lots of snow or ice around the wheels or wheel housings.

4. Using tire chains on the vehicle.

5. Using wheels/tires not equipped with TPMS sensors.

NOTE:

1. The compact spare tire does not have a tire pressure monitoring sensor. Therefore, the TPMS will not monitor the pressure in the compact spare tire.

2. If you install the compact spare tire in place of a road tire that has a pressure below the low-pressure warning limit, upon the next ignition key cycle, the TPMS Telltale

light will remain on and a chime will sound. In addition, the graphic in the EVIC will still display a flashing pressure value.

3. After driving the vehicle for up to 10 minutes above 15 mph (25 km/h), the TPMS Telltale light will flash on and off for 75 seconds and then remain on solid. In addition, the EVIC will display a "CHECK TPM SYSTEM" message for three seconds and then display dashes (- -) in place of the pressure value.

4. For each subsequent ignition key cycle, a chime will sound, the TPMS Telltale light will flash on and off for 75 seconds and then remain on solid, and the EVIC will display a "CHECK TPM SYSTEM" message for three seconds and then display dashes (- -) in place of the pressure value.

5. Once you repair or replace the original road tire and reinstall it on the vehicle in place of the compact spare, the TPMS will update automatically. In addition, the TPMS Telltale light will turn off and the graphic in the EVIC will display a new pressure value instead of dashes (- -), as long as no tire pressure is below the low-pressure warning limit in any of the four active road tires. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) in order for the TPMS to receive this information.

General Information

This device complies with Part 15 of the FCC rules and RSS 210 of Industry Canada. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

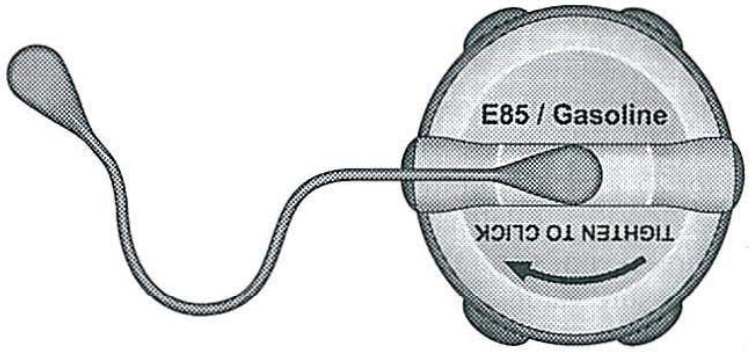
The tire pressure sensors are covered under one of the following licenses:

United States KR5S120123
Canada 2671-S120123

FLEXIBLE FUEL— 2.7L ENGINES ONLY (EXCEPT CALIFORNIA EMISSION STATES)

E-85 GENERAL INFORMATION

The information in this section is for Flexible Fuel vehicles only. This section only covers those subjects that are unique to these vehicles. Please refer to the other sections of this manual for information on features that are common between Flexible Fuel and gasoline only powered vehicles.



E-85 Fuel Cap

CAUTION!

Only vehicles with the special E-85 fuel filler cap can operate on E-85.