

REPORT NUMBER 138-STF-09-004

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

FORD MOTOR COMPANY
2009 FORD EDGE SE
FOUR-DOOR MPV
NHTSA NO. C90203

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



March 25, 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 Ford Edge SE 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 Ford Edge SE four-door MPV. Nomenclatures applicable to the test vehicle are:

A. Vehicle Identification Number: 2FMDK36C89BA34371

B. NHTSA Number: C90203

C. Manufacturer: Ford Motor Company

D. Manufacture Date: 10/2008

1.3 TEST DATE

The test vehicle was tested during the time period March 4 through March 17, 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.
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.

Two malfunction scenarios were performed on the Ford Edge. 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 a TPMS fuse.

2.2 SUMMARY OF RESULTS

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

- A. Right front
- B. Left rear and right rear
- 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 front 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.

One malfunction detection scenario was performed on the test vehicle at UVW + VCW:

- H. A TPMS fuse 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: March 4 – March 17, 2009 LAB: U. S. DOT San Angelo Test Facility

VIN: 2FMDK36C89BA34371 VEHICLE NHTSA NUMBER: C90203

CERTIFICATION LABEL BUILD DATE: 10/2008

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 4, 2009 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90203 VIN: 2FMDK36C89BA34371

CERTIFICATION LABEL BUILD DATE: 10/2008 ENGINE: 3.5 liter 6 cylinder

MY/MAKE/MODEL/BODY STYLE: 2009 Ford Edge SE four-door MPV

TIRE CONDITIONING:

(X) Tires used more than 100 km. Actual odometer reading : 267.3 km (166.1 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: Sensor: Siemens P/N 6F2T-1A150-Ax

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

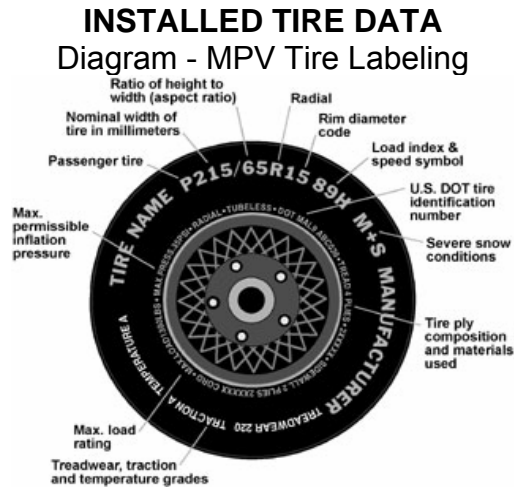
TPMS MALFUNCTION INDICATOR TYPE:

() 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	P235/65R17	240 kPa (35 psi)	Vehicle placard
Rear	P235/65R17	240 kPa (35 psi)	Vehicle placard



Front and Rear Axles

Tire Size and Load Index / Speed Rating: P235/65R17 103T

Manufacturer/Tire Name: Hankook DynaPro AS

Sidewall Max Load Rating: 875 kg (1,929 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? YES NO

Are all installed tires the same as designated by the vehicle manufacturer on the vehicle placard? 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	<u>240</u> kPa x .75 = <u>180</u> kPa	<u>240</u> kPa x .75 = <u>180</u> 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 <u>300</u> kPa (44 psi) <u>140</u> kPa (20 psi)	(X) P-metric-Standard load () P-metric-Extra Load Load Range () C, () D, or () E (X) Maximum or () Rated <u>300</u> kPa (44 psi) <u>140</u> kPa (20 psi)
(C) Telltale Warning Activation Pressure is the higher of Part (A) or (B)	<u>180</u> kPa (26 psi)	<u>180</u> kPa (26 psi)
(D) Pressure at which to deflate tire(s) = (C) – 7 kPa	<u>173</u> kPa (25 psi)	<u>173</u> kPa (25 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 4, 2009

APPROVED BY: Kenneth H. Yates

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

TEST DATE: March 4, 2009 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90203

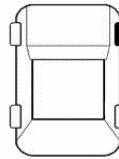
TPMS Low Tire Pressure Warning Telltale

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: Between the speedometer and
tachometer, above the odometer

Identify Telltale Symbol Used (check box above figure).



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:

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

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

Time telltale remains illuminated 3 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 4, 2009

APPROVED BY: Kenneth H. Yates

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

TEST DATE: March 4, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90203

Time: Start: 9:02 am End: 11:24 am

Ambient Temperature: Start: 19.9°C (67.8°F) End: 22.8°C (73.0°F)

Odometer Reading: Start: 269.1 km (167.2 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): 1:30 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	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)
Tire Sidewall Temp	19.8°C (67.6°F)	20.2°C (68.4°F)	20.4°C (68.7°F)	19.8°C (67.6°F)

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

VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: 2,422 kg (5,340 lbs)

GAWR (front): 1,288 kg (2,840 lbs)

GAWR (rear): 1,148 kg (2,530 lbs)

Vehicle Capacity Weight:

Vehicle Capacity Weight 412 kg (909 lbs)

Measured Unloaded Vehicle Weight:

LF	<u>558 kg (1,231 lbs)</u>	LR	<u>376 kg (828 lbs)</u>
RF	<u>538 kg (1,187 lbs)</u>	RR	<u>379 kg (836 lbs)</u>
Front		Rear	
Axle	<u>1,096 kg (2,418 lbs)</u>	Axle	<u>755 kg (1,664 lbs)</u>
Total Vehicle		<u>1,851 kg (4,082 lbs)</u>	

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

LF	<u>615 kg (1,355 lbs)</u>	LR	<u>422 kg (930 lbs)</u>
RF	<u>594 kg (1,310 lbs)</u>	RR	<u>430 kg (948 lbs)</u>
Front		Rear	
Axle	<u>1,209 kg (2,665 lbs) (≤ GAWR)</u>	Axle	<u>852 kg (1,878 lbs) (≤ GAWR)</u>
Total Vehicle		<u>2,061 kg (4,543 lbs) (not greater than GVWR)</u>	

Note: For scenarios A, B, C, and G, this total vehicle weight measures the vehicle loaded to Lightly Loaded Vehicle Weight (LLVW), 209 kg (461 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: March 6, 2009 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90203

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: <u>19.3°C (66.7°F)</u> Vehicle cool down period: <u>overnight</u>				
Inflation Pressure	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)
Tire Sidewall Temp	19.4°C (66.9°F)	19.4°C (66.9°F)	19.6°C (67.3°F)	19.2°C (66.6°F)
San Angelo Test Facility Shop Floor Temp	19.6°C (67.3°F)	20.0°C (68.0°F)	19.8°C (67.6°F)	19.6°C (67.3°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 15:09:09 UTC End: 15:32:59 UTC
 Trip Odometer Reading: Start: 316.6 km (196.7 mi) End: 348.6 km (216.6 mi)
 Ambient Temperature: Start: 19.3°C (66.7°F) End: 19.3°C (66.7°F)
 Roadway Temperature: Start: 20.4°C (68.7°F) End: 20.2°C (68.4°F)

Driving in first direction:

Goodfellow Air Force
 Starting point: Base (GAFB) north gate Direction: see chart, page 60
10:07 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 60
10:21 minutes (stopwatch time) 16.3 km (10.1 mi) distance

Max speed: 101.4 km/h (63.0 mph)

Total Driving Time: 20:08 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	258.0 kPa (37.4 psi)	255.1 kPa (37.0 psi)	256.3 kPa (37.2 psi)	259.0 kPa (37.6 psi)
Tire Sidewall Temp	26.6°C (79.9°F)	25.6°C (78.1°F)	25.4°C (77.7°F)	27.4°C (81.3°F)
San Angelo Test Facility Shop Floor Temp	19.6°C (67.3°F)	20.2°C (68.4°F)	19.8°C (67.6°F)	19.4°C (66.9°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				173.0 kPa (25.1 psi)

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop

Direction: see chart, page 61

14:50 minutes (stopwatch time – non-cumulative)

16.9 km (10.5 mi) distance

Max speed: 98.6 km/hr (61.3 mph)

Total Driving Time: 10:17 minutes (VBox time)

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: <u>21.5°C (70.7°F)</u> Vehicle cool down period: <u>66</u> minutes				
Inflation Pressure	247.1 kPa (35.8 psi)	245.0 kPa (35.5 psi)	245.7 kPa (35.6 psi)	166.8 kPa (24.2 psi)
Tire Sidewall Temp	22.2°C (72.0°F)	22.2°C (72.0°F)	22.6°C (72.7°F)	22.6°C (72.7°F)
San Angelo Test Facility Shop Floor Temp	20.4°C (68.7°F)	20.8°C (69.4°F)	20.8°C (69.4°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:				
	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)

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

Starting point: San Angelo Test Facility shop

1:35 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: March 6, 2009

APPROVED BY: Kenneth H. Yates

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

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

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

VEHICLE NHTSA NUMBER: C90203

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: <u>19.6°C (67.3°F)</u> Vehicle cool down period: <u>overnight</u>				
Inflation Pressure	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)
Tire Sidewall Temp	19.8°C (67.6°F)	19.8°C (67.6°F)	19.6°C (67.3°F)	19.4°C (66.9°F)
San Angelo Test Facility Shop Floor Temp	19.6°C (67.3°F)	20.0°C (68.0°F)	20.0°C (68.0°F)	19.6°C (67.3°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 14:19:22 UTC End: 14:43:52 UTC
 Trip Odometer Reading: Start: 376.1 km (233.7 mi) End: 408.1 km (253.6 mi)
 Ambient Temperature: Start: 19.7°C (67.5°F) End: 20.5°C (68.9°F)
 Roadway Temperature: Start: 20.8°C (69.4°F) End: 21.2°C (70.2°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 62
10:05 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
10:15 minutes (stopwatch time) 16.3 km (10.1 mi) distance

Max speed: 99.3 km/h (61.7 mph)

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

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

SCENARIO B – Left Rear and 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	259.4 kPa (37.6 psi)	256.0 kPa (37.1 psi)	258.0 kPa (37.4 psi)	259.7 kPa (37.7 psi)
Tire Sidewall Temp	29.2°C (84.6°F)	26.8°C (80.2°F)	27.2°C (81.0°F)	28.6°C (83.5°F)
San Angelo Test Facility Shop Floor Temp	19.6°C (67.3°F)	19.8°C (67.6°F)	19.8°C (67.6°F)	19.6°C (67.3°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		173.0 kPa (25.1 psi)	173.0 kPa (25.1 psi)	

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: see chart, page 63
13:56 minutes (stopwatch time – non-cumulative) 16.1 km (10.0 mi) distance

Max speed: 100.8 km/hr (62.6 mph)

Total Driving Time: 10:18 minutes (VBox time)

TELLTALE ILLUMINATES WITHIN 20 MINUTES: <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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? 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? YES NO (fail)

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

SCENARIO B – Left Rear and 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: <u>22.8°C (73.0°F)</u> Vehicle cool down period: <u>66</u> minutes				
Inflation Pressure	247.6 kPa (35.9 psi)	167.0 kPa (24.2 psi)	166.4 kPa (24.1 psi)	248.0 kPa (36.0 psi)
Tire Sidewall Temp	23.0°C (73.4°F)	23.2°C (73.8°F)	23.2°C (73.8°F)	23.2°C (73.8°F)
San Angelo Test Facility Shop Floor Temp	21.0°C (69.8°F)	21.2°C (70.2°F)	21.2°C (70.2°F)	20.8°C (69.4°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:	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)

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

Starting point: San Angelo Test Facility shop

1:40 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TPMS Performance Test Results (PASS/FAIL)

Left rear and right rear tires were deflated at LLVW.

PASS

REMARKS: None

RECORDED BY: Jack R. Stewart

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

VEHICLE NHTSA NUMBER: C90203

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: <u>24.2°C (75.6°F)</u> Vehicle cool down period: <u>68</u> minutes				
Inflation Pressure	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)
Tire Sidewall Temp	23.4°C (74.1°F)	24.2°C (75.6°F)	23.8°C (74.8°F)	23.8°C (74.8°F)
San Angelo Test Facility Shop Floor Temp	21.8°C (71.2°F)	22.2°C (72.0°F)	22.4°C (72.3°F)	21.6°C (70.9°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 18:06:55 UTC End: 18:31:23 UTC
 Trip Odometer Reading: Start: 433.6 km (269.4 mi) End: 465.4 km (289.2 mi)
 Ambient Temperature: Start: 24.4°C (75.9°F) End: 25.0°C (77.0°F)
 Roadway Temperature: Start: 30.4°C (86.7°F) End: 30.6°C (87.1°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 64
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 64
10:22 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 98.6 km/h (61.3 mph)

Total Driving Time: 20:31 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	261.0 kPa (37.9 psi)	257.9 kPa (37.4 psi)	260.8 kPa (37.8 psi)	260.4 kPa (37.8 psi)
Tire Sidewall Temp	34.2°C (93.6°F)	32.2°C (90.0°F)	34.2°C (93.6°F)	33.6°C (92.5°F)
San Angelo Test Facility Shop Floor Temp	22.2°C (72.0°F)	22.4°C (72.3°F)	22.6°C (72.7°F)	22.2°C (72.0°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	173.0 kPa (25.1 psi)	173.0 kPa (25.1 psi)	173.0 kPa (25.1 psi)	173.0 kPa (25.1 psi)

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: see chart, page 65
14:22 minutes (stopwatch time – non-cumulative) 16.3 km (10.1 mi) distance

Max speed: 96.4 km/hr (59.9 mph)

Total Driving Time: 10:18 minutes (VBox time)

TELLTALE ILLUMINATES WITHIN 20 MINUTES: <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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? 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? 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: <u>25.7°C (78.3°F)</u> Vehicle cool down period: <u>60</u> minutes				
Inflation Pressure	165.2 kPa (24.0 psi)	166.3 kPa (24.1 psi)	164.8 kPa (23.9 psi)	166.0 kPa (24.1 psi)
Tire Sidewall Temp	25.8°C (78.4°F)	26.4°C (79.5°F)	26.6°C (79.9°F)	26.6°C (79.9°F)
San Angelo Test Facility Shop Floor Temp	22.4°C (72.3°F)	22.8°C (73.0°F)	23.2°C (73.8°F)	22.8°C (73.0°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:				
	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)

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

Starting point: San Angelo Test Facility shop

1:29 minutes (stopwatch time – non-cumulative) 0.3 km (0.2 mi) distance

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: March 9, 2009

APPROVED BY: Kenneth H. Yates

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

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

VEHICLE NHTSA NUMBER: C90203

Time: Start: 10:38 am End: 1:40 pm

Ambient Temperature: Start: 23.3°C (73.9°F) End: 25.6°C (78.1°F)

Odometer Reading: Start: 490.2 km (304.6 mi)

Fuel Level: Start: Full

Weather Conditions: Overcast and calm

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	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)
Tire Sidewall Temp	22.8°C (73.0°F)	24.2°C (75.6°F)	25.2°C (77.4°F)	23.2°C (73.8°F)

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

VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: 2,422 kg (5,340lbs)

GAWR (front): 1,288 kg (2,840 lbs)

GAWR (rear): 1,148 kg (2,530 lbs)

Vehicle Capacity Weight:

Vehicle Capacity Weight 412 kg (909 lbs)

Measured Unloaded Vehicle Weight:

LF	<u>560 kg (1,235 lbs)</u>	LR	<u>377 kg (831 lbs)</u>
RF	<u>541 kg (1,193 lbs)</u>	RR	<u>375 kg (826 lbs)</u>
Front		Rear	
Axle	<u>1,101 kg (2,428 lbs)</u>	Axle	<u>752 kg (1,657 lbs)</u>
Total Vehicle		<u>1,853 kg (4,085 lbs)</u>	

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

LF	<u>622 kg (1,372 lbs)</u>	LR	<u>518 kg (1,142 lbs)</u>
RF	<u>608 kg (1,341 lbs)</u>	RR	<u>517 kg (1,139 lbs)</u>
Front		Rear	
Axle	<u>1,230 kg (2,713 lbs)</u> (≤ GAWR)	Axle	<u>1,035 kg (2,281 lbs)</u> (≤ GAWR)
Total Vehicle		<u>2,265 kg (4,994 lbs)</u> (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), 412 kg (909 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: March 16, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90203

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: <u>12.0°C (53.6°F)</u> Vehicle cool down period: <u>overnight</u>				
Inflation Pressure	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)
Tire Sidewall Temp	12.6°C (54.7°F)	12.2°C (54.0°F)	12.2°C (54.0°F)	12.6°C (54.7°F)
San Angelo Test Facility Shop Floor Temp	13.4°C (56.1°F)	13.4°C (56.1°F)	13.4°C (56.1°F)	13.4°C (56.1°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 14:19:51 UTC End: 14:43:55 UTC
Trip Odometer Reading: Start: 491.3 km (305.3 mi) End: 523.4 km (325.2 mi)
Ambient Temperature: Start: 12.2°C (54.0°F) End: 13.2°C (55.8°F)
Roadway Temperature: Start: 12.0°C (53.6°F) End: 14.8°C (58.6°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 66
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 66
10:17 minutes (stopwatch time) 16.3 km (10.1 mi) distance

Max speed: 99.8 km/h (62.0 mph)

Total Driving Time: 20:30 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	261.7 kPa (38.0 psi)	261.2 kPa (37.9 psi)	263.0 kPa (38.1 psi)	262.0 kPa (38.0 psi)
Tire Sidewall Temp	25.6°C (78.1°F)	23.8°C (74.8°F)	23.2°C (73.8°F)	23.8°C (74.8°F)
San Angelo Test Facility Shop Floor Temp	13.4°C (56.1°F)	13.4°C (56.1°F)	13.2°C (55.8°F)	13.2°C (55.8°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 (X)LR ()RR ()RF Inflation Pressure		173.0 kPa (25.1 psi)		

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: see chart, page 67
14:49 minutes (stopwatch time – non-cumulative) 16.1 km (10.0 mi) distance

Max speed: 99.4 km/hr (61.8 mph)

Total Driving Time: 10:11 minutes (VBox time)

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: <u>18.7°C (65.7°F)</u> Vehicle cool down period: <u>61</u> minutes				
Inflation Pressure	252.1 kPa (36.6 psi)	167.0 kPa (24.2 psi)	253.0 kPa (36.7 psi)	252.4 kPa (36.6 psi)
Tire Sidewall Temp	18.8°C (65.8°F)	17.6°C (63.7°F)	17.4°C (63.3°F)	17.6°C (63.7°F)
San Angelo Test Facility Shop Floor Temp	15.0°C (59.0°F)	15.2°C (59.4°F)	15.0°C (59.0°F)	14.8°C (58.6°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? 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:	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)

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

Starting point: San Angelo Test Facility shop

1:24 minutes (stopwatch time – non-cumulative) 0.3 km (0.2 mi) distance

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL)

Left rear tire was deflated at LLVW.

PASS

REMARKS: None

RECORDED BY: Jack R. Stewart

DATE: March 16, 2009

APPROVED BY: Kenneth H. Yates

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

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

TEST DATE: March 16, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90203

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: <u>21.6°C (70.9°F)</u> Vehicle cool down period: <u>60</u> minutes				
Inflation Pressure	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)
Tire Sidewall Temp	17.6°C (63.7°F)	18.4°C (65.1°F)	18.8°C (65.8°F)	19.2°C (66.6°F)
San Angelo Test Facility Shop Floor Temp	15.4°C (59.7°F)	15.6°C (60.1°F)	16.0°C (60.8°F)	15.2°C (59.4°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 17:43:02 UTC End: 18:07:13 UTC
 Trip Odometer Reading: Start: 548.1 km (340.6 mi) End: 580.0 km (360.4 mi)
 Ambient Temperature: Start: 21.8°C (71.2°F) End: 24.6°C (76.3°F)
 Roadway Temperature: Start: 33.8°C (92.8°F) End: 35.4°C (95.7°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 68
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 68
10:20 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 98.7 km/h (61.3 mph)

Total Driving Time: 20:29 minutes (VBox time)

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

SCENARIO E – Left Front, 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	265.8 kPa (38.6 psi)	265.6 kPa (38.5 psi)	269.2 kPa (39.0 psi)	266.1 kPa (38.6 psi)
Tire Sidewall Temp	32.2°C (90.0°F)	34.8°C (94.6°F)	33.6°C (92.5°F)	34.2°C (93.6°F)
San Angelo Test Facility Shop Floor Temp	16.4°C (61.5°F)	16.8°C (62.2°F)	16.8°C (62.2°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: (X)LF ()LR (X)RR ()RF Inflation Pressure	173.0 kPa (25.1 psi)		173.0 kPa (25.1 psi)	

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: See chart , page 69
13:41 minutes (stopwatch time – non-cumulative) 15.9 km (9.9 mi) distance

Max speed: 100.4 km/hr (62.4 mph)

Total Driving Time: 10:09 minutes (VBox time)

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 Front, 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: <u>26.2°C (79.2°F)</u> Vehicle cool down period: <u>60</u> minutes				
Inflation Pressure	163.5 kPa (23.7 psi)	249.5 kPa (36.2 psi)	161.9 kPa (23.5 psi)	250.0 kPa (36.3 psi)
Tire Sidewall Temp	23.4°C (74.1°F)	23.2°C (73.8°F)	23.6°C (74.5°F)	24.4°C (75.9°F)
San Angelo Test Facility Shop Floor Temp	17.6°C (63.7°F)	17.8°C (64.0°F)	18.0°C (64.4°F)	17.4°C (63.3°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:	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)

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

Starting point: San Angelo Test Facility shop

1:46 minutes (stopwatch time – non-cumulative) 0.3 km (0.2 mi) distance

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL)

Left front and right rear tires were deflated at UVW + VCW.

PASS

REMARKS: None

RECORDED BY: Jack R. Stewart

DATE: March 16, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 3 (Sheet 20 of 22)
TPMS OPERATIONAL PERFORMANCE
SCENARIO F – Left Rear, Right Rear, and Right Front
Tire Deflation at UVW +VCW

TEST DATE: March 17, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90203

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: <u>14.4°C (57.9°F)</u> Vehicle cool down period: <u>overnight</u>				
Inflation Pressure	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)
Tire Sidewall Temp	15.6°C (60.1°F)	15.6°C (60.1°F)	15.6°C (60.1°F)	15.6°C (60.1°F)
San Angelo Test Facility Shop Floor Temp	15.8°C (60.4°F)	15.8°C (60.4°F)	15.8°C (60.4°F)	15.8°C (60.4°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 14:13:37 UTC End: 14:37:55 UTC
 Trip Odometer Reading: Start: 605.1 km (376.0 mi) End: 637.1 km (395.9 mi)
 Ambient Temperature: Start: 14.7°C (58.5°F) End: 16.7°C (62.1°F)
 Roadway Temperature: Start: 14.9°C (58.8°F) End: 17.4°C (63.3°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 70
10:08 minutes (stopwatch time) 15.9 km (9.9 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 70
10:20 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 98.3 km/h (61.1 mph)

Total Driving Time: 20:29 minutes (VBox time)

DATA SHEET 3 (Sheet 21 of 22)
TPMS OPERATIONAL PERFORMANCE
SCENARIO F – 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	264.0 kPa (38.3 psi)	262.2 kPa (38.0 psi)	264.0 kPa (38.3 psi)	263.0 kPa (38.1 psi)
Tire Sidewall Temp	26.8°C (80.2°F)	26.6°C (79.9°F)	25.8°C (78.4°F)	26.4°C (79.5°F)
San Angelo Test Facility Shop Floor Temp	15.0°C (59.0°F)	16.0°C (60.8°F)	15.4°C (59.7°F)	15.6°C (60.1°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 (X)RF Inflation Pressure		173.0 kPa (25.1 psi)	173.0 kPa (25.1 psi)	173.0 kPa (25.1 psi)

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: see chart, page 71
13:57 minutes (stopwatch time – non-cumulative) 16.1 km (10.0 mi) distance

Max speed: 96.8 km/hr (60.1 mph)

Total Driving Time: 10:08 minutes (VBox time)

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 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: <u>22.5°C (72.5°F)</u> Vehicle cool down period: <u>60</u> minutes				
Inflation Pressure	252.8 kPa (36.7 psi)	166.6 kPa (24.2 psi)	166.1 kPa (24.1 psi)	168.2 kPa (24.4 psi)
Tire Sidewall Temp	21.2°C (70.2°F)	20.8°C (69.4°F)	21.8°C (71.2°F)	22.6°C (72.7°F)
San Angelo Test Facility Shop Floor Temp	17.8°C (64.0°F)	18.4°C (65.1°F)	18.4°C (65.1°F)	18.0°C (64.4°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:	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)	240.0 kPa (34.8 psi)

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

Starting point: San Angelo Test Facility shop

1:32 minutes (stopwatch time – non-cumulative) 0.3 km (0.2 mi) distance

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL)

Left rear, right rear, and right front tires were deflated at UVW +VCW.

PASS

REMARKS: None

RECORDED BY: Jack R. Stewart

DATE: March 17, 2009

APPROVED BY: Kenneth H. Yates

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

TEST DATE: March 5, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90203

Time:	Start:	<u>14:02:45 UTC</u>	End:	<u>14:24:01 UTC</u>
Trip Odometer Reading:	Start:	<u>269.4 km (167.4mi)</u>	End:	<u>299.5 km (186.1 mi)</u>
Ambient Temperature:	Start:	<u>15.5°C (59.9°F)</u>	End:	<u>16.7°C (62.1°F)</u>
Roadway Temperature:	Start:	<u>14.2°C (57.6°F)</u>	End:	<u>17.4°C (63.3°F)</u>
Fuel Level:	Start:	<u>Full</u>		

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 72

21:28 minutes (stopwatch time – non-cumulative) 30.1 km (18.7 mi) distance

Max speed: 99.6 km/h (61.9 mph)

Total Driving Time: 16:52 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? YES NO (fail)

Time it takes before telltale starts flashing 5 seconds

Time telltale remains flashing 75 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? YES NO (fail)

Extinguishment Phase:

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

Starting point: San Angelo Test Facility shop

 0:40 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

COMBINATION MALFUNCTION TELLTALE EXTINGUISHED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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: March 5, 2009

APPROVED BY: Kenneth H. Yates

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

TEST DATE: March 17, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90203

Time:	Start:	<u>1:28 pm</u>	End:	<u>1:43 pm</u>
Odometer Reading:	Start:	<u>661.1 km (410.8 mi)</u>	End:	<u>661.1 km (410.8 mi)</u>
Ambient Temperature:	Start:	<u>22.5°C (72.5°F)</u>	End:	<u>22.5°C (72.5°F)</u>
Roadway Temperature:	Start:	<u>NA</u>	End:	<u>NA</u>
Fuel Level:	Start:	<u>Full</u>		

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

TPMS MALFUNCTION TELLTALE:

() Dedicated stand-alone () Combination low tire pressure warning/malfunction telltale

METHOD OF MALFUNCTION SIMULATION:

Describe method of malfunction simulation: A TPMS fuse was removed.

MALFUNCTION TELLTALE ILLUMINATION

(after ignition locking system is activated to “On” (“Run”) position):

Combination Malfunction Telltale

Illumination upon start-up - driving was not required.

COMBINATION MALFUNCTION TELLTALE ILLUMINATES (FLASHING AND ILLUMINATION SEQUENCE) WITHIN 20 MINUTES:

() YES () NO

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:

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 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:

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:

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?

- Significance of the low tire pressure warning telltale illuminating
- A description of corrective action to be undertaken
- 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: Jack R. Stewart

DATE: March 4, 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	3/20/2008	3/20/2009
AMBIENT TEMPERATURE GAUGE	FLUKE 50D K/J THERMOMETER	SERIAL # 80840101	3/10/2008	3/10/2009
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

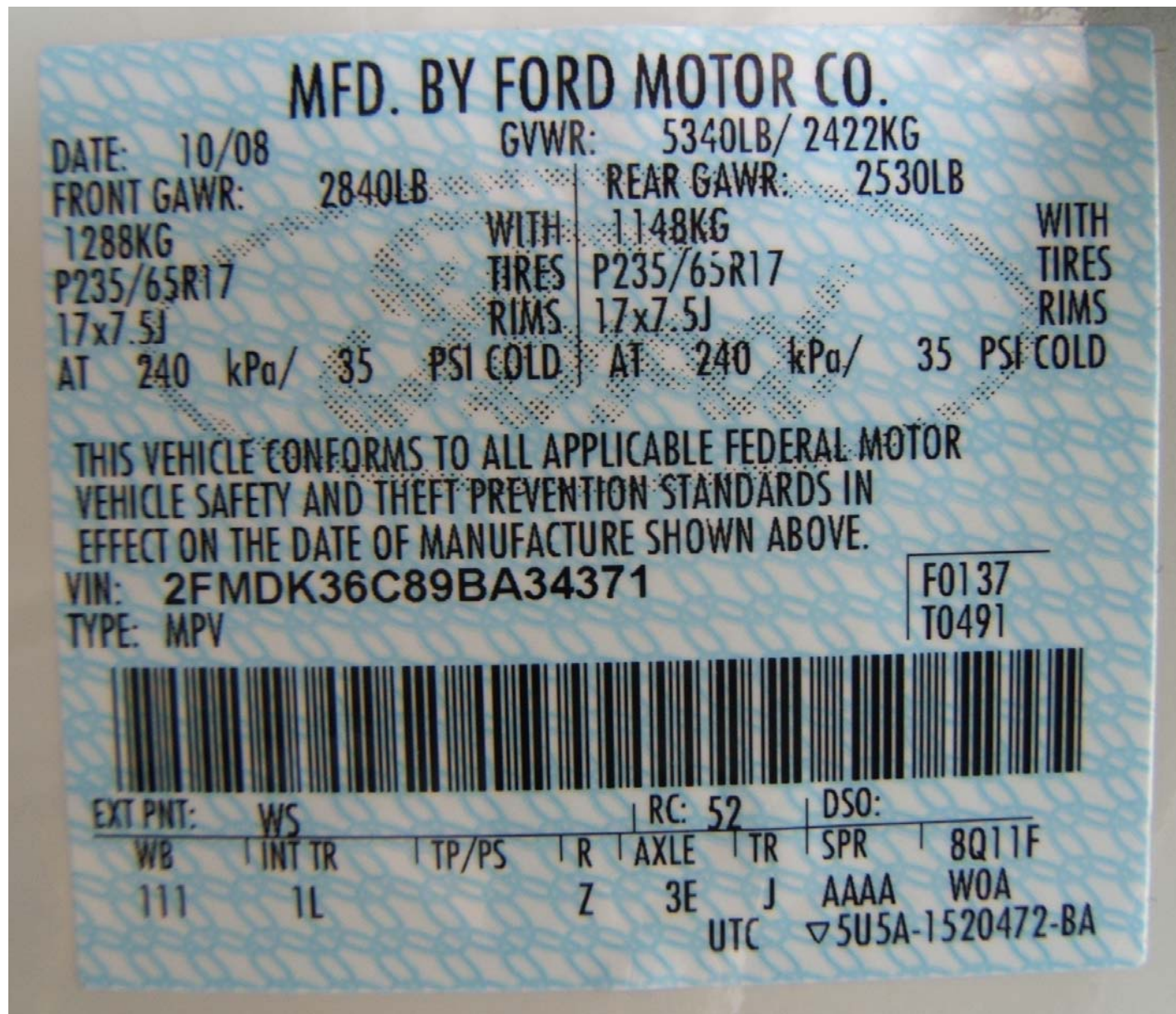
*This gauge used beginning March 10.

SECTION 5
PHOTOGRAPHS



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO.138

FIGURE 5.1
¾ FRONT VIEW FROM LEFT SIDE OF VEHICLE



2009 FORD EDGE SE
 NHTSA NO. C90203
 FMVSS NO.138

FIGURE 5.2
 VEHICLE CERTIFICATION LABEL



TIRE AND LOADING INFORMATION

SEATING CAPACITY TOTAL : 5 FRONT: 2 REAR: 3

The combined weight of occupants and cargo should never exceed : 412 kg or 909 lbs.

▽ 5U5A-1532-AA (TLU)

TIRE	SIZE	COLD TIRE PRESSURE	SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION
FRONT	P235/65R17	240 KPA, 35 PSI	
REAR	P235/65R17	240 KPA, 35 PSI	
SPARE	T165/80D17	415 KPA, 60 PSI	



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.3
VEHICLE PLACARD



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.4
TIRE SHOWING BRAND



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.5
TIRE SHOWING MODEL



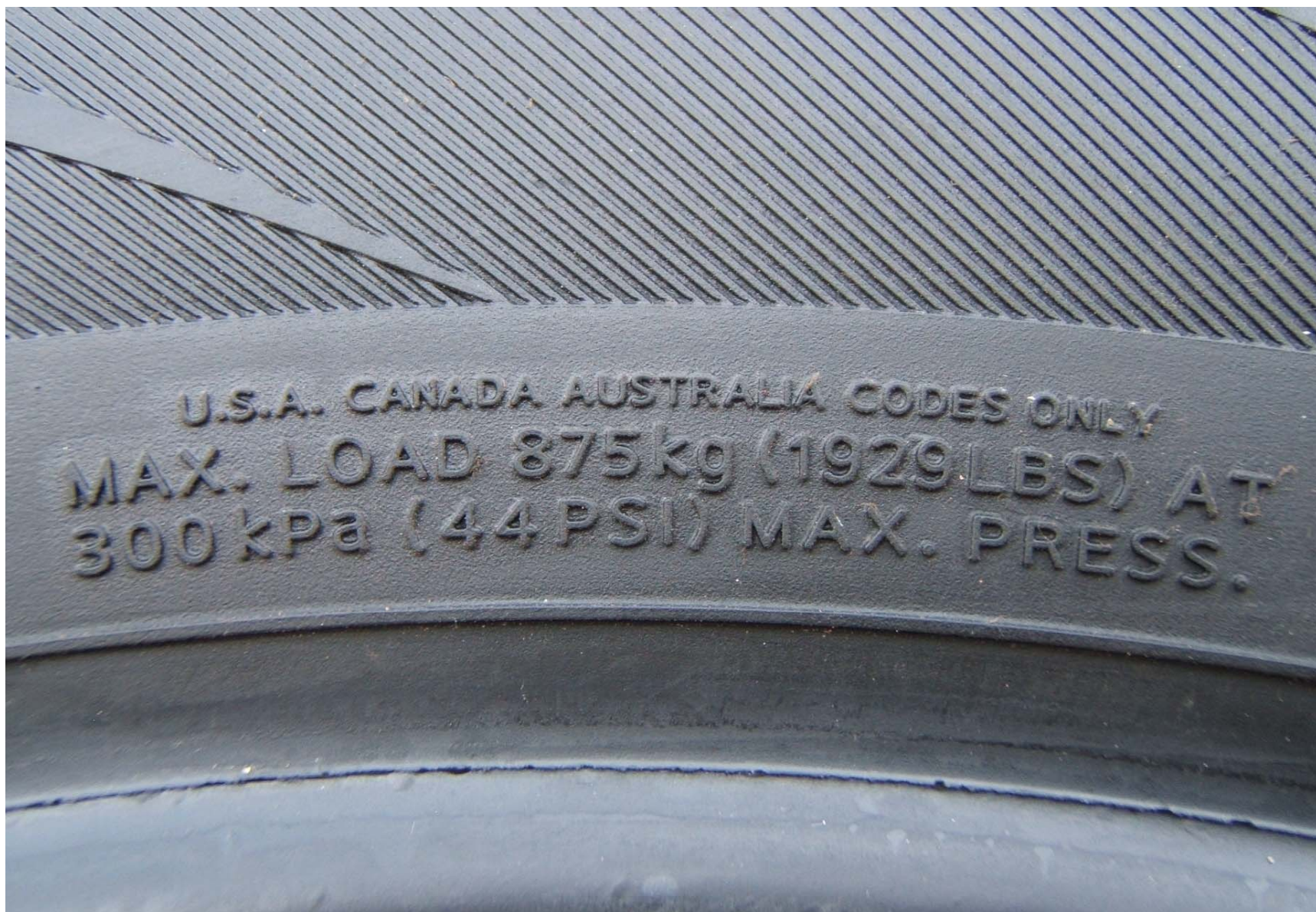
2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.6
TIRE SHOWING SIZE AND LOAD INDEX / SPEED RATING



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.7
TIRE SHOWING DOT SERIAL NUMBER



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

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



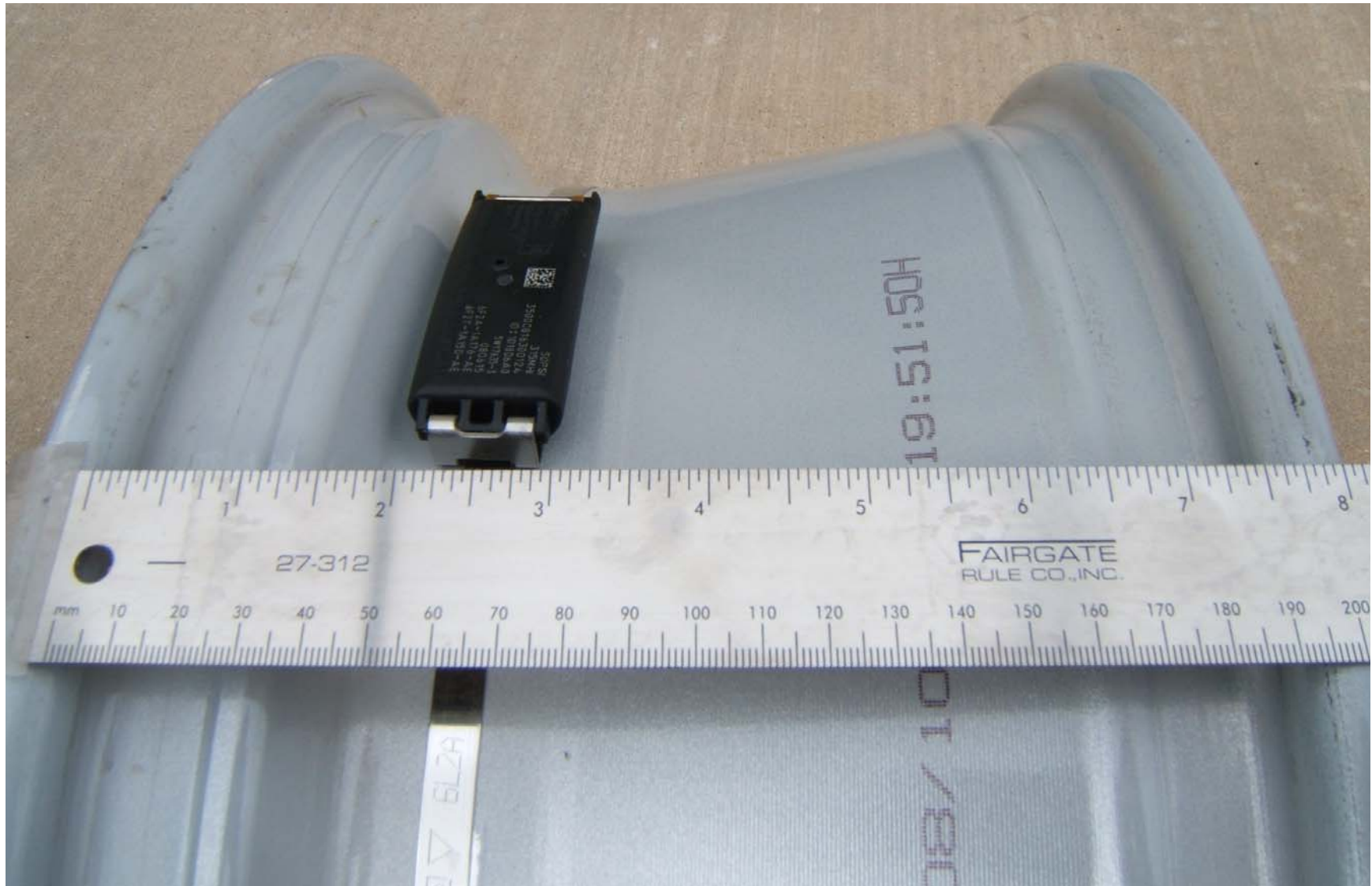
2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.9
TIRE SHOWING SIDEWALL / TREAD CONSTRUCTION



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.10
RIM SHOWING TPMS SENSOR



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.11
RIM CONTOUR FOR FULL WIDTH OF CROSS SECTION



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

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



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO 138

FIGURE 5.13
TEST INSTRUMENTATION INSTALLED IN VEHICLE



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.14
VEHICLE REAR SEAT BALLAST
FOR UVW + VCW LOAD



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.15
REAR OF VEHICLE BALLAST FOR UVW + VCW LOAD



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.16
VEHICLE ON WEIGHT SCALES



2009 FORD EDGE SE
NHTSA NO. C90203
FMVSS NO. 138

FIGURE 5.17
SPARE INSTALLED ON RIGHT FRONT
FOR MALFUNCTION DETECTION TEST

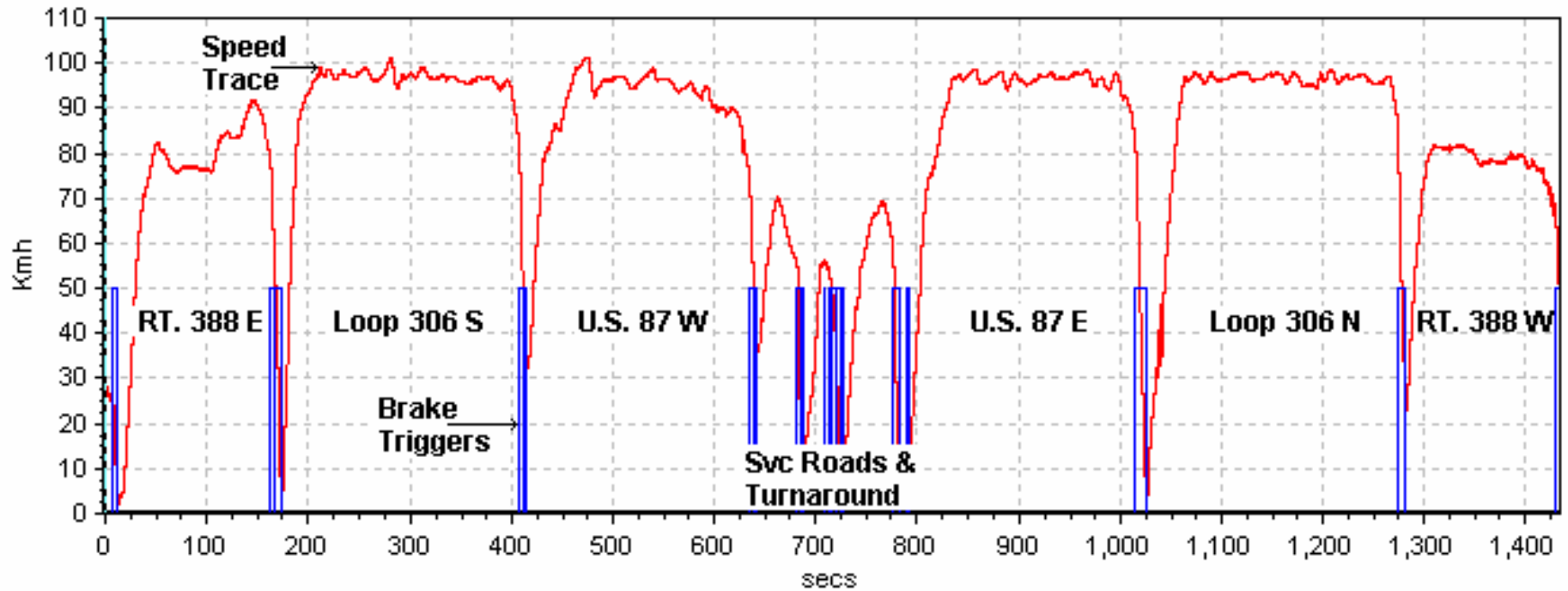
SECTION 6
TEST PLOTS

Scenario A: Right Front Tire at LLVW
Test Date: 3/6/09
Data File Time: 23:54 minutes
Cumulative Driving Time: 20:08 minutes
Start Point: GAFB North Gate

Calibration Phase:

2009 Ford Edge (C90203) RF Calibration LLVW

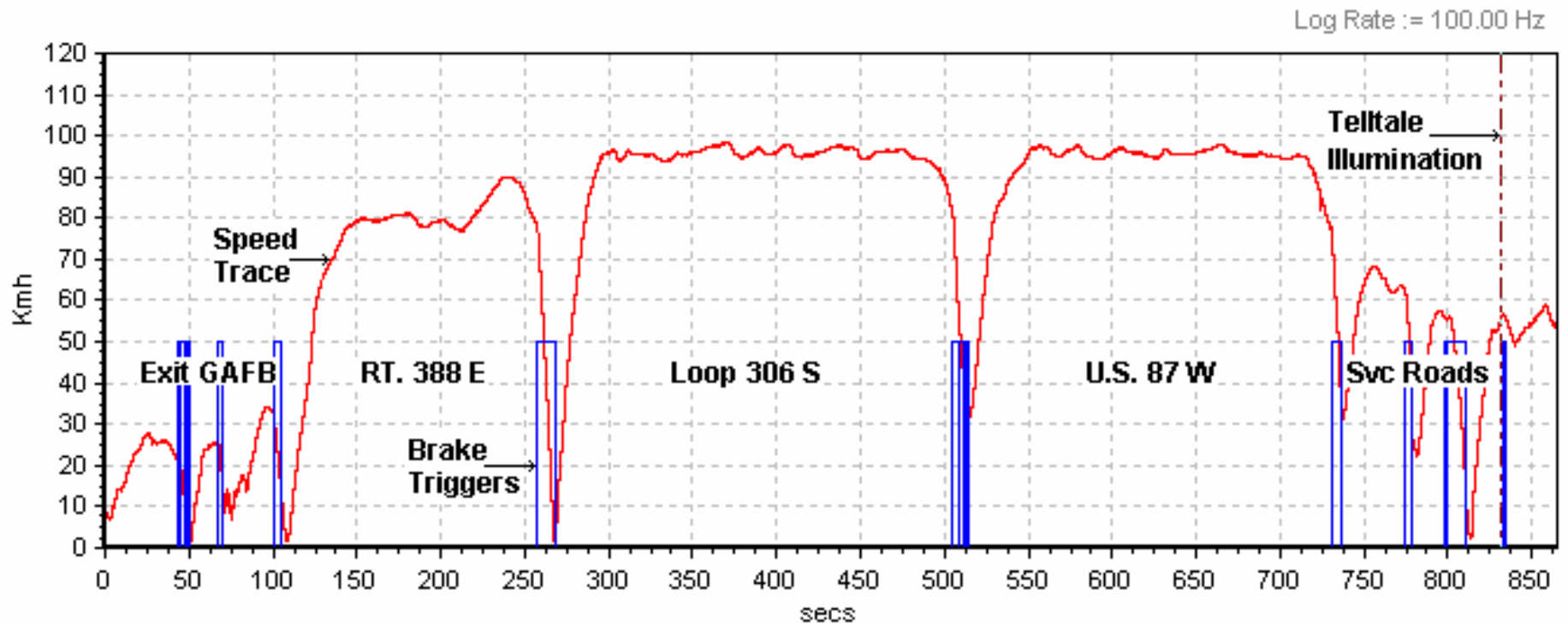
Log Rate := 100.00 Hz



Scenario A: Right Front Tire at LLVW
Test Date: 3/6/09
Data File Time: 14:25 minutes
Cumulative Driving Time: 10:17 minutes
Start Point: San Angelo Test Facility shop

Detection Phase:

2009 Ford Edge (C90203) RF Illumination LLVW

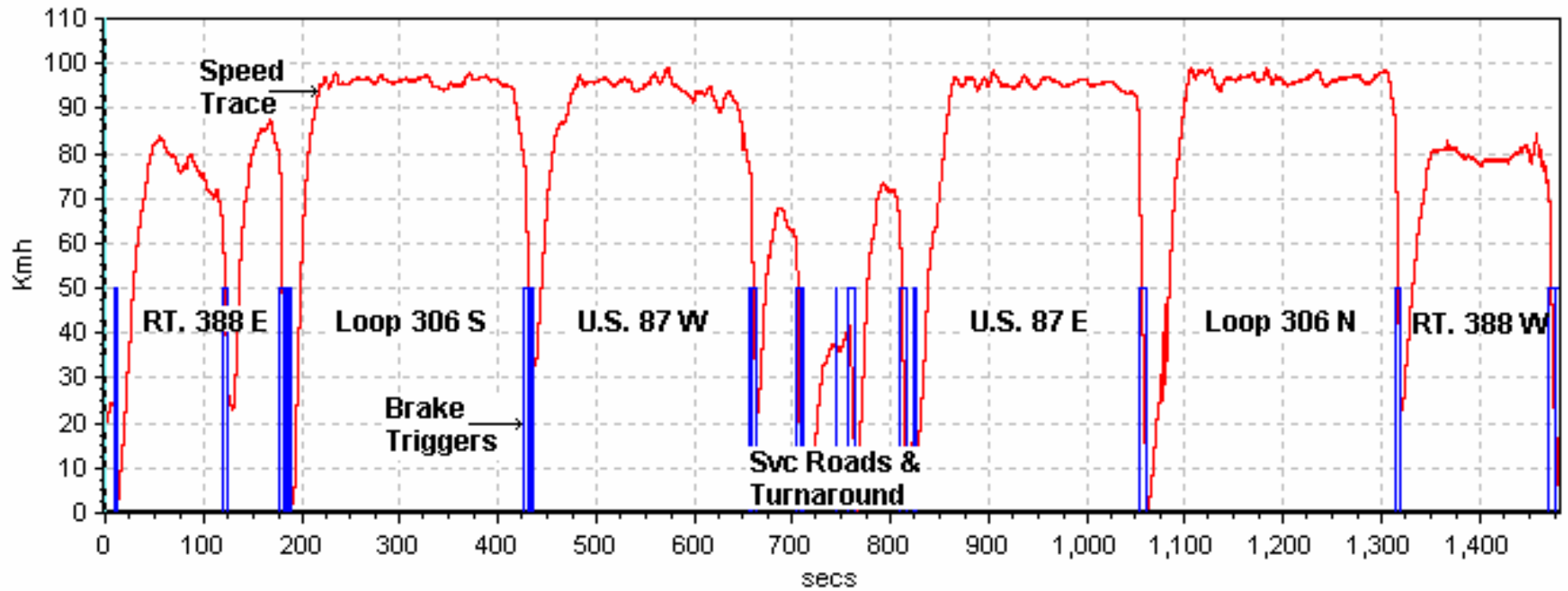


Scenario B: Left Rear, Right Rear Tires at LLVW
Test Date: 3/9/09
Data File Time: 24:42 minutes
Cumulative Driving Time: 20:20 minutes
Start Point: GAFB North Gate

Calibration Phase:

2009 Ford Edge (C90203) LR, RR Calibration LLVW

Log Rate := 100.00 Hz

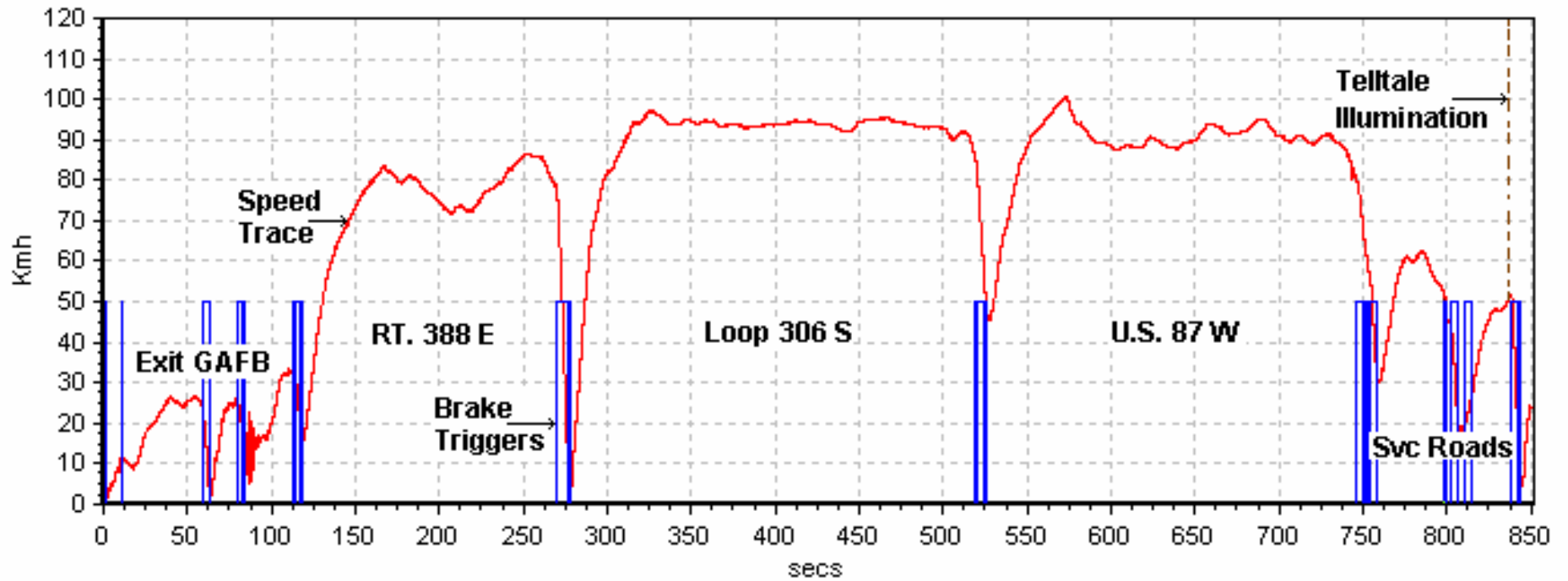


Scenario B: Left Rear, Right Rear Tires at LLWW
Test Date: 3/9/09
Data File Time: 14:12 minutes
Cumulative Driving Time: 10:18 minutes
Start Point: San Angelo Test Facility shop

Detection Phase:

2009 Ford Edge (C90203) LR, RR Illumination LLWW

Log Rate := 100.00 Hz

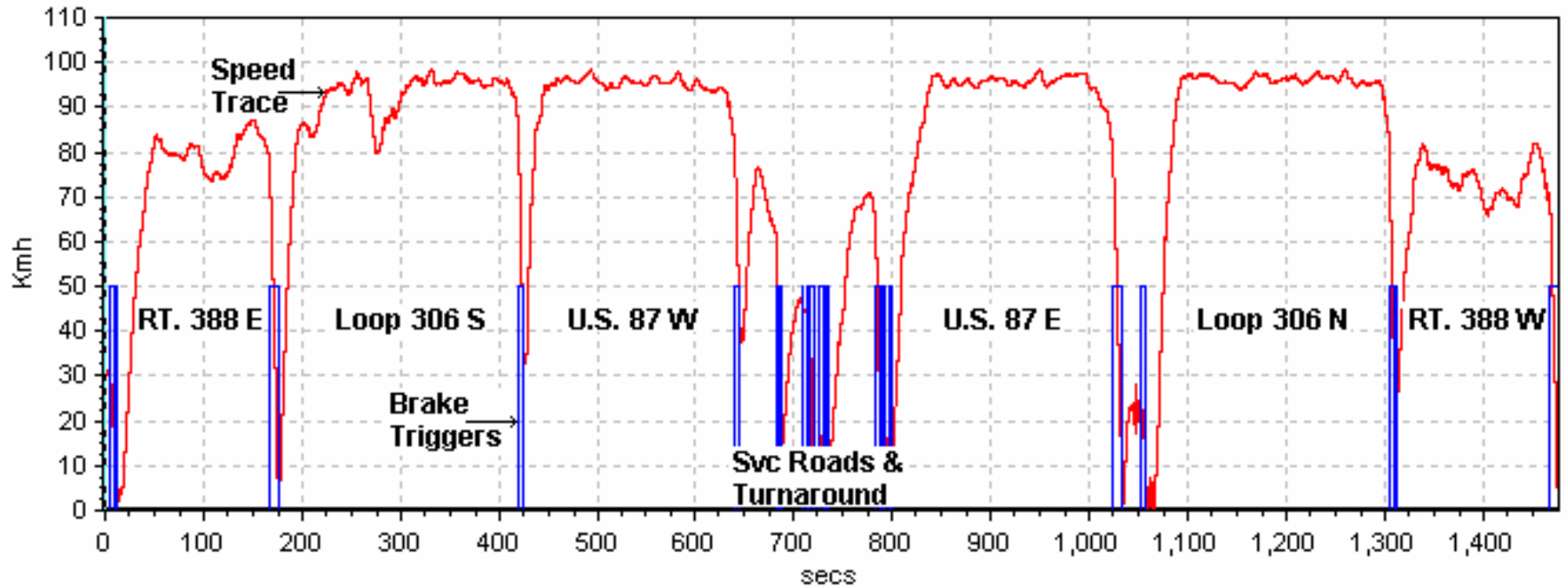


Scenario C: Left Front, Left Rear, Right Rear, Right Front Tires at LLVW
Test Date: 3/9/09
Data File Time: 24:37 minutes
Cumulative Driving Time: 20:31 minutes
Start Point: GAFB North Gate

Calibration Phase:

2009 Ford Edge (C90203) LF, LR, RR, RF Calibration LLVW

Log Rate := 100.00 Hz

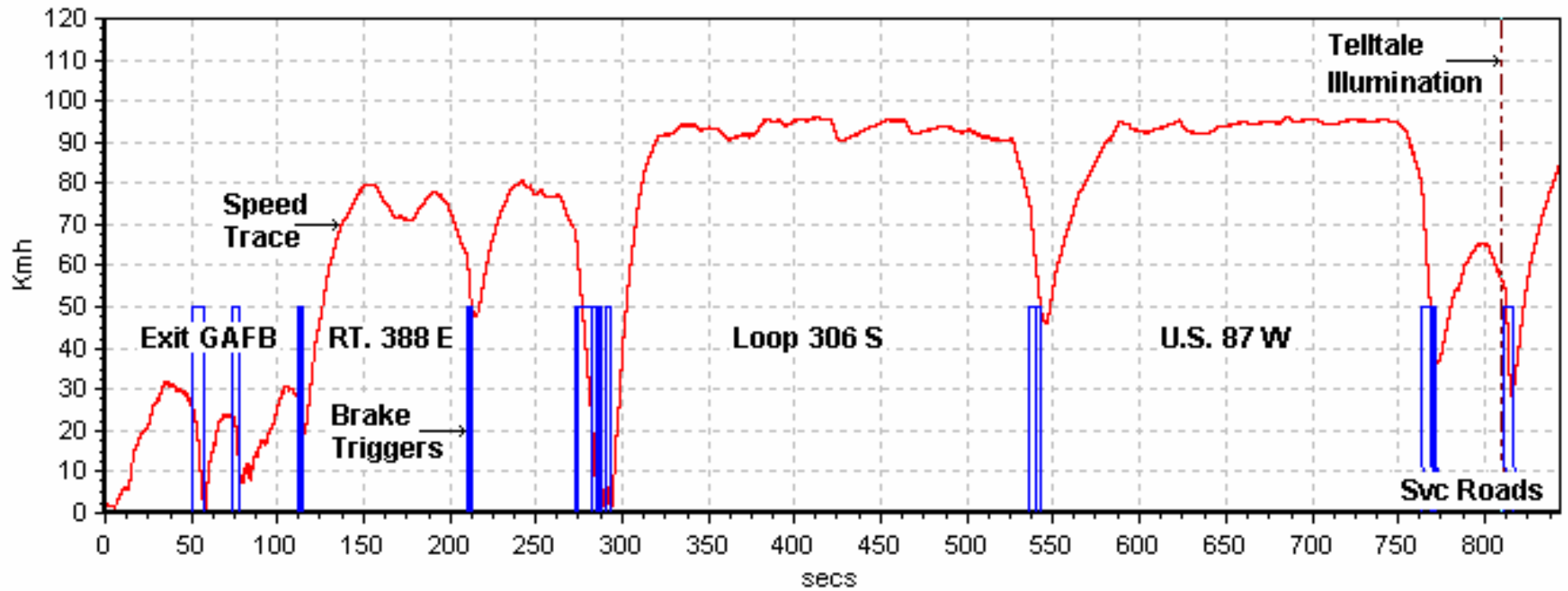


Scenario C: Left Front, Left Rear, Right Rear, Right Front Tires at LLVW
Test Date: 3/9/09
Data File Time: 14:04 minutes
Cumulative Driving Time: 10:18 minutes
Start Point: San Angelo Test Facility shop

Detection Phase:

2009 Ford Edge (C90203) LF, LR, RR, RF Illumination LLVW

Log Rate := 100.00 Hz

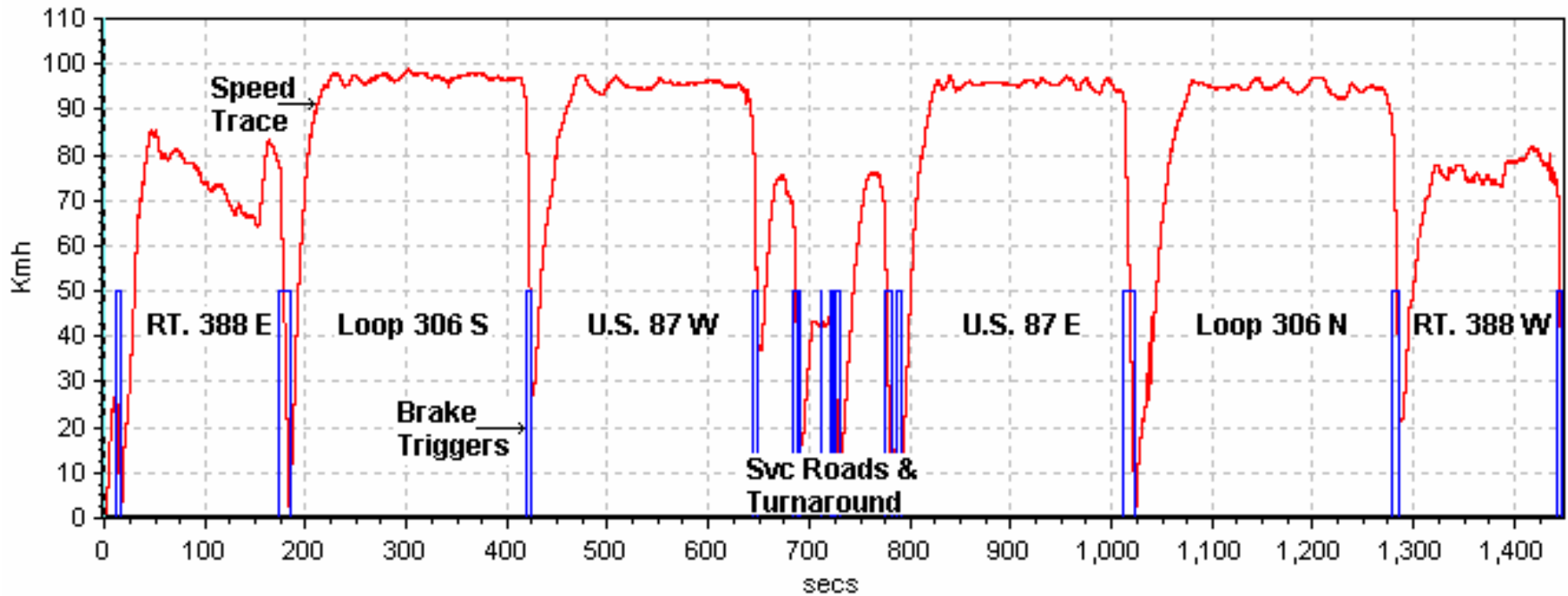


Scenario D: Left Rear Tire at UVW + VCW
Test Date: 3/16/09
Data File Time: 24:10 minutes
Cumulative Driving Time: 20:30 minutes
Start Point: GAFB North Gate

Calibration Phase:

2009 Ford Edge (C90203) LR Calibration UVW+VCW

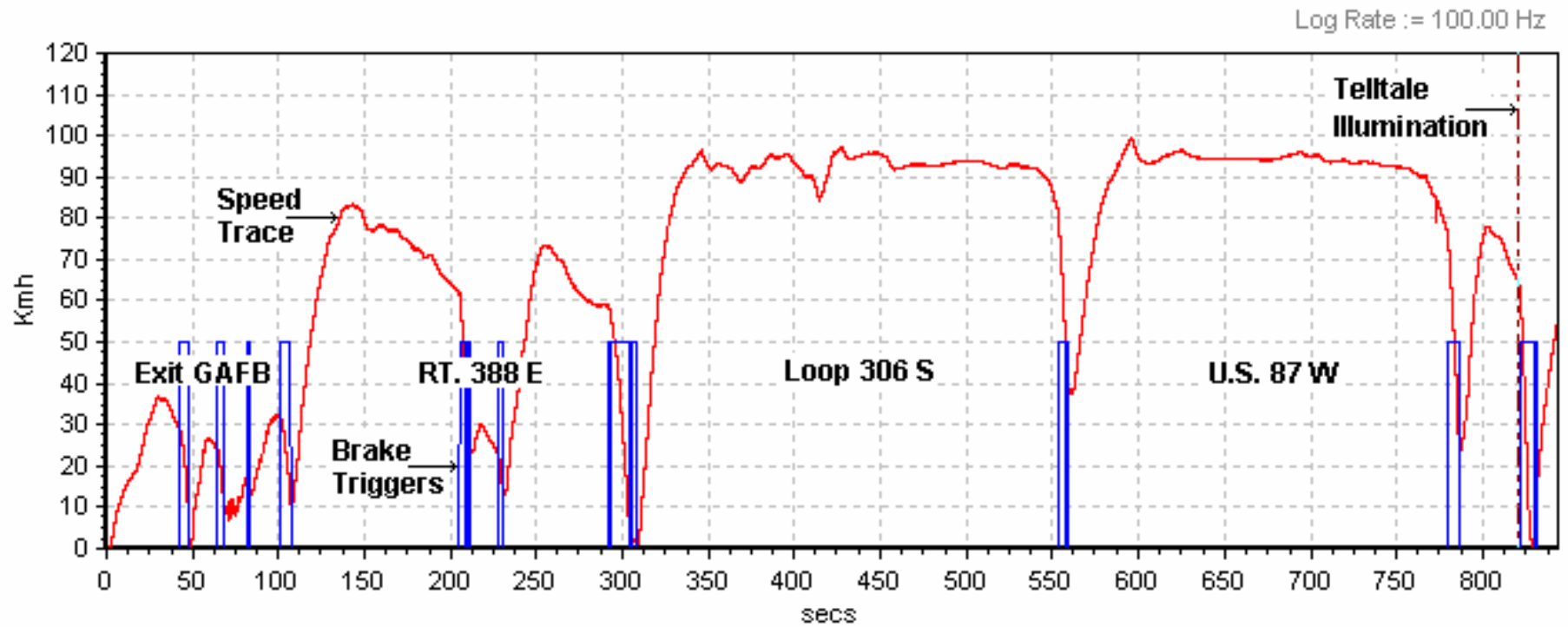
Log Rate := 100.00 Hz



Scenario D: Left Rear Tire at UVW + VCW
Test Date: 3/16/09
Data File Time: 14:04 minutes
Cumulative Driving Time: 10:11 minutes
Start Point: San Angelo Test Facility shop

Detection Phase:

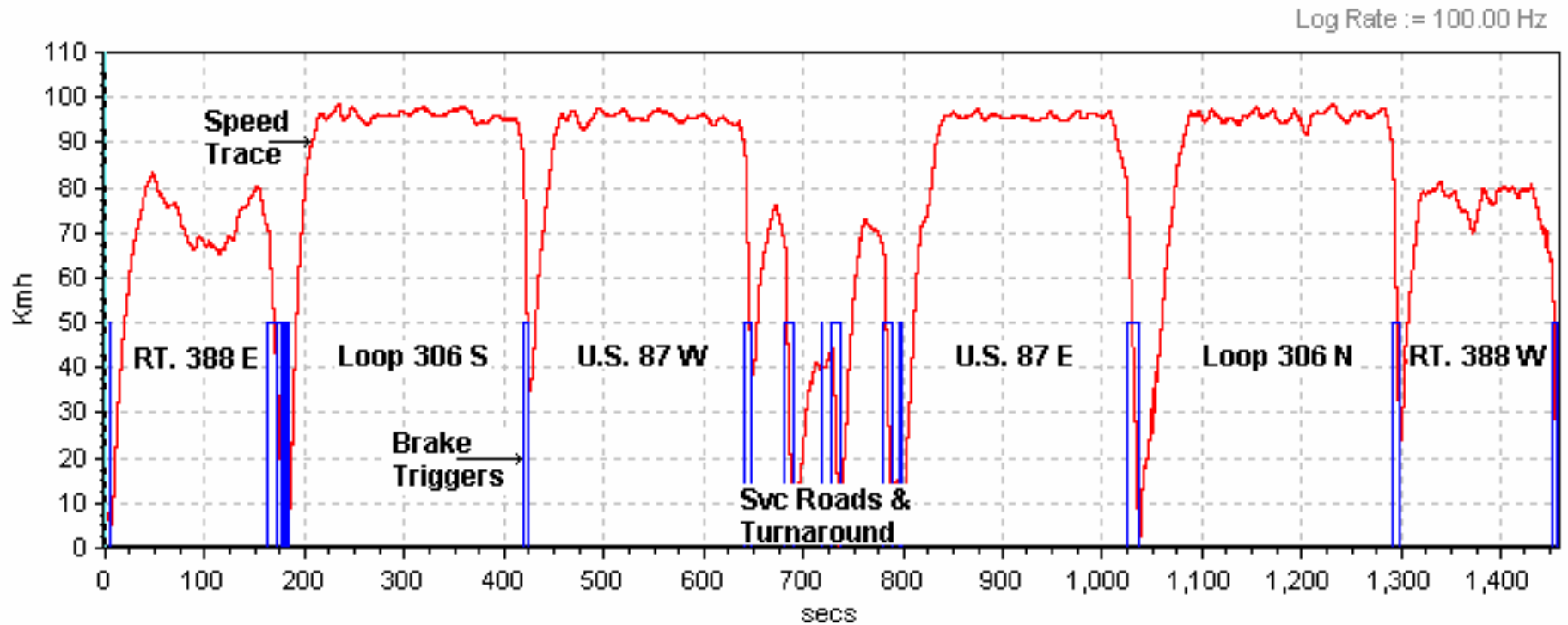
2009 Ford Edge (C90203) LR Illumination UVW+VCW



Scenario E: Left Front, Right Rear Tires at UVW + VCW
Test Date: 3/16/09
Data File Time: 24:18 minutes
Cumulative Driving Time: 20:29 minutes
Start Point: GAFB North Gate

Calibration Phase:

2009 Ford Edge (C90203) LF, RR Calibration UWW+VCW

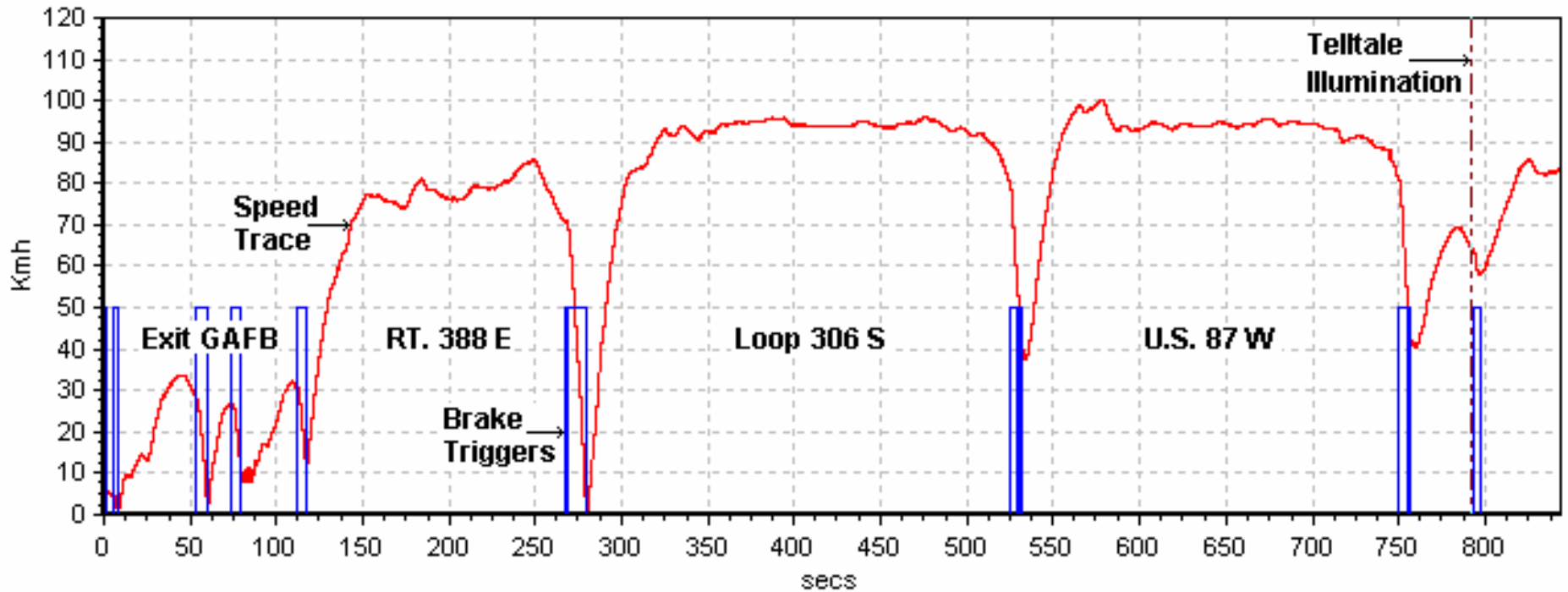


Scenario E: Left Front, Right Rear Tires at UVW + VCW
Test Date: 3/16/09
Data File Time: 14:04 minutes
Cumulative Driving Time: 10:09 minutes
Start Point: San Angelo Test Facility shop

Detection Phase:

2009 Ford Edge (C90203) LF, RR Illumination UVW+VCW

Log Rate := 100.00 Hz

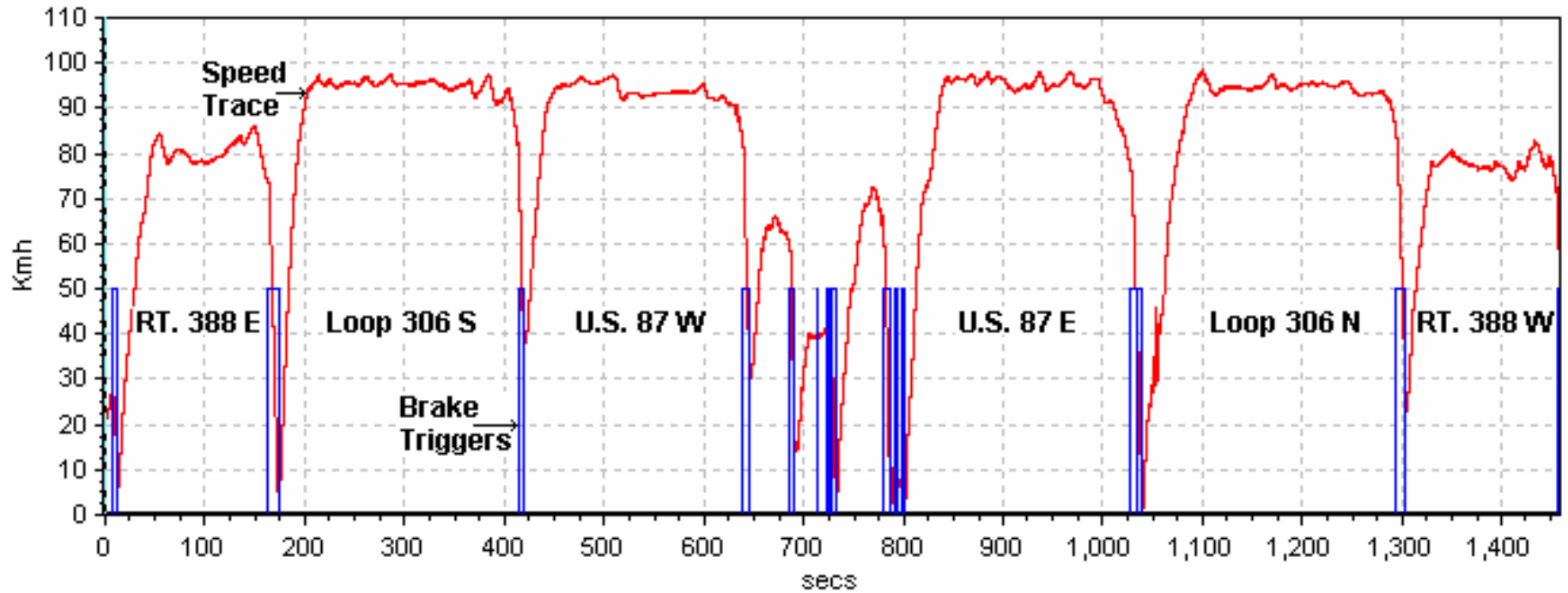


Scenario F: Left Rear, Right Rear, Right Front Tires at UVW + VCW
Test Date: 3/17/09
Data File Time: 24:18 minutes
Cumulative Driving Time: 20:29 minutes
Start Point: GAFB North Gate

Calibration Phase:

2009 Ford Edge (C90203) LR, RR, RF Calibration UVW+VCW

Log Rate := 100.00 Hz

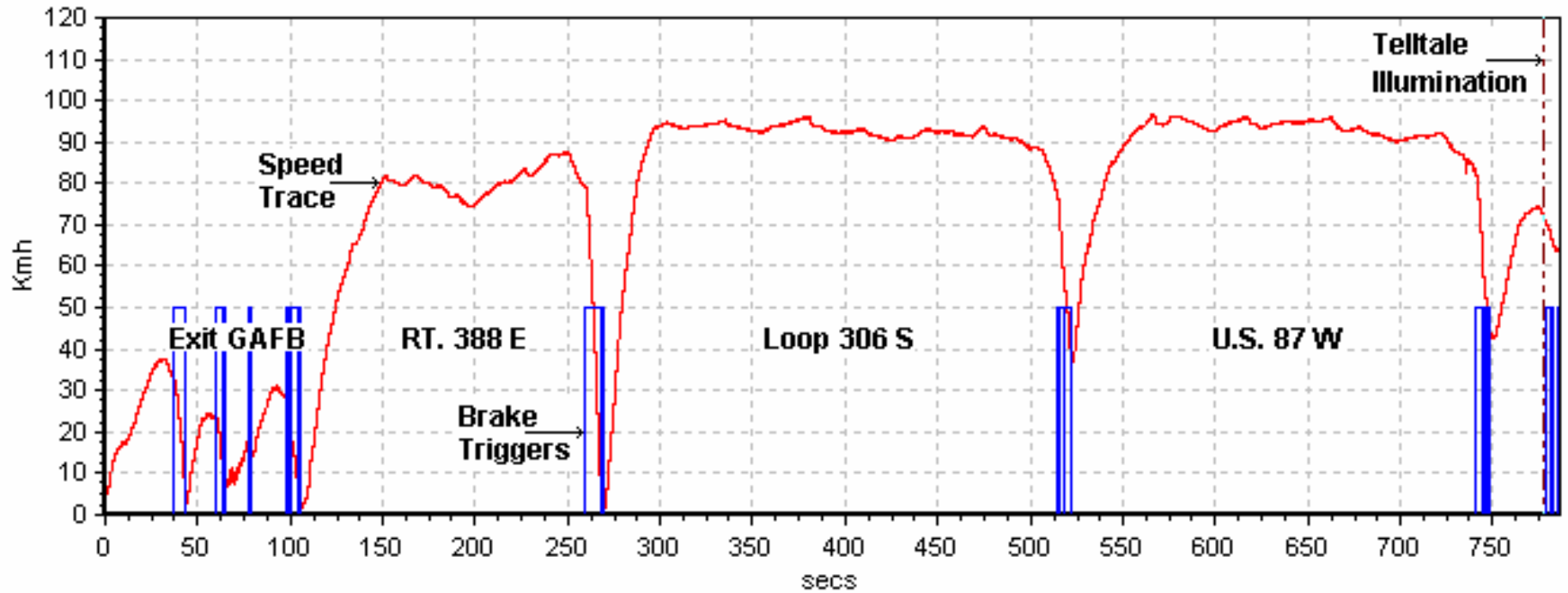


Scenario F: Left Rear, Right Rear, Right Front Tires at UVW + VCW
Test Date: 3/17/09
Data File Time: 13:06 minutes
Cumulative Driving Time: 10:08 minutes
Start Point: San Angelo Test Facility shop

Detection Phase:

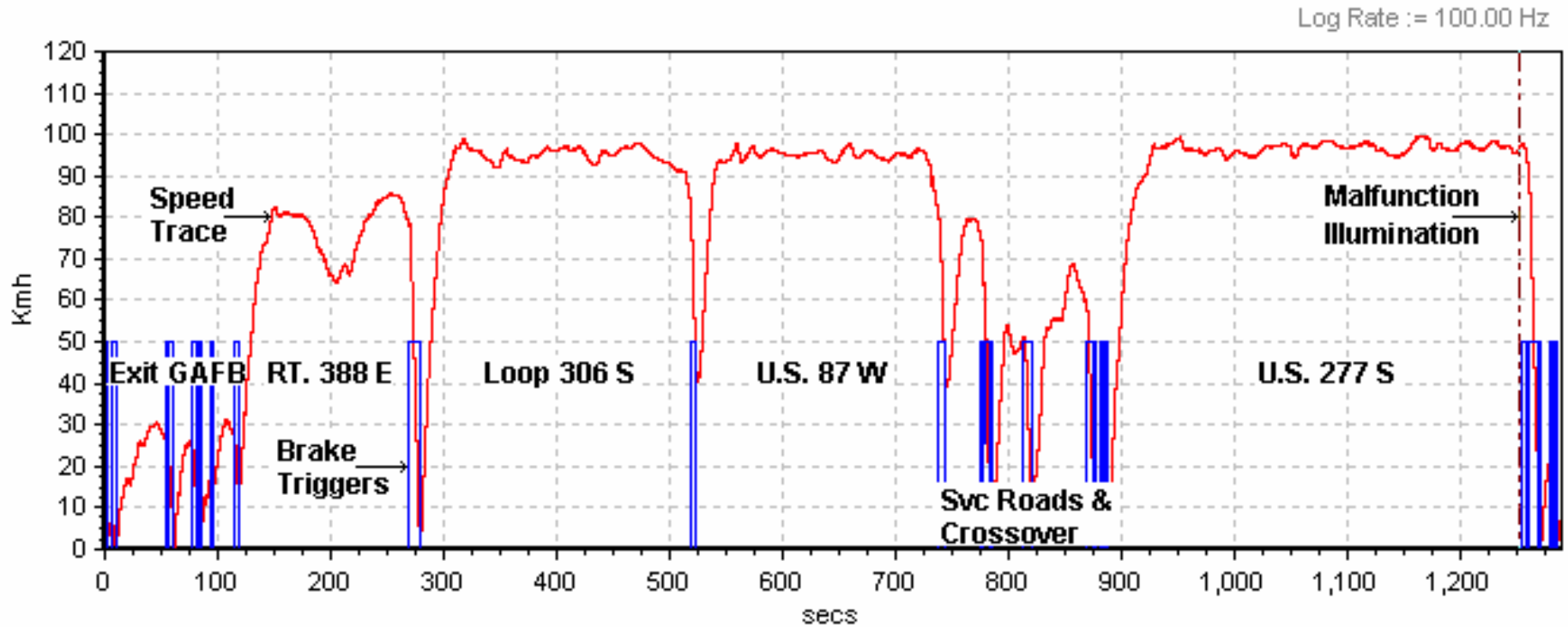
2009 Ford Edge (C90203) LR, RR, RF Illumination UVW+VCW

Log Rate := 100.00 Hz



Scenario G Malfunction Illumination: Spare Tire without TPMS Sensor Applied to Right Front at LLVW.
Test Date: 3/5/09
Data File Time: 21:30 minutes
Cumulative Driving Time: 16:52 minutes
Start Point: San Angelo Test Facility shop

2009 Ford Edge (C90203) RF Spare Tire Malfunction Illumination LLVW



SECTION 7
OWNER'S MANUAL PAGES

Tires, Wheels and Loading

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.

The Tire Pressure Monitoring System complies with part 15 of the FCC rules and with RSS-210 of Industry Canada. Operation is subject to the

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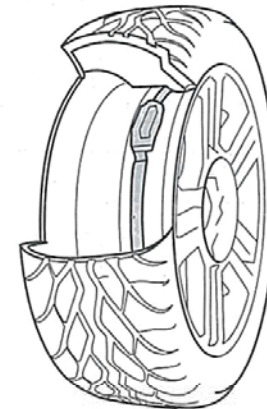
following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

WARNING: The Tire Pressure Monitoring System is NOT a substitute for manually checking tire pressure. The tire pressure should be checked periodically (at least monthly) using a tire gauge, see *Inflating your tires* in this chapter. Failure to properly maintain your tire pressure could increase the risk of tire failure, loss of control, vehicle rollover and personal injury.

Changing tires with TPMS

Each road tire is equipped with a tire pressure sensor fastened to the inside rim of the wheel. The pressure sensor is covered by the tire and is not visible unless the tire is removed. The pressure sensor is located opposite (180 degrees) from the valve stem. Care must be taken when changing the tire to avoid damaging the sensor. It is recommended that you always have your tires serviced by an authorized dealer.

The tire pressure should be checked periodically (at least monthly) using an accurate tire gauge, refer to *Inflating your tires* in this chapter.



Understanding your Tire Pressure Monitoring System (TPMS)

The Tire Pressure Monitoring System measures pressure in your four road tires and sends the tire pressure readings to your vehicle. The Low Tire Pressure Warning Lamp will turn ON if the tire pressure is significantly low. Once the light is illuminated, your tires are under inflated and need to be inflated to the manufacturer's recommended tire pressure. Even if the light turns ON and a short time later turns OFF, your tire pressure still needs to be checked. Visit www.checknmytires.org for additional information.

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When your temporary spare tire is installed

When one of your road tires needs to be replaced with the temporary spare, the TPMS system will continue to identify an issue to remind you that the damaged road wheel/tire needs to be repaired and put back on your vehicle.

To restore the full functionality of the Tire Pressure Monitoring System, have the damaged road wheel/tire repaired and remounted on your vehicle. For additional information, refer to *Changing tires with TPMS* in this section.

When you believe your system is not operating properly

The main function of the Tire Pressure Monitoring System is to warn you when your tires need air. It can also warn you in the event the system is no longer capable of functioning as intended. Please refer to the following chart for information concerning your Tire Pressure Monitoring System:

Low Tire Pressure Warning Light	Possible cause	Customer Action Required
Solid Warning Light	Tire(s) under-inflated	1. Check your tire pressure to ensure tires are properly inflated; refer to <i>Inflating your tires</i> in this chapter. 2. After inflating your tires to the manufacturer's recommended inflation pressure as shown on the Tire Label (located on the edge of driver's door or the B-Pillar), the vehicle must be driven for at least two minutes over 20 mph (32 km/h) before the light will turn OFF.
	Spare tire in use	Your temporary spare tire is in use. Repair the damaged road wheel/tire and reinstall it on the vehicle to restore system functionality. For a description on how the system functions, refer to <i>When your temporary spare tire is installed</i> in this section.
	TPMS malfunction	If your tires are properly inflated and your spare tire is not in use and the light remains ON, contact your authorized dealer as soon as possible.

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Low Tire Pressure Warning Light	Possible cause	Customer Action Required
Flashing Warning Light	Spare tire in use	Your temporary spare tire is in use. Repair the damaged road wheel and re-mount it on the vehicle to restore system functionality. For a description of how the system functions under these conditions, refer to <i>When your temporary spare tire is installed</i> in this section.
	TPMS malfunction	If your tires are properly inflated and your spare tire is not in use and the TPMS warning light still flashes, contact your authorized dealer as soon as possible.

When inflating your tires

When putting air into your tires (such as at a gas station or in your garage), the Tire Pressure Monitoring System may not respond immediately to the air added to your tires.

It may take up to two minutes of driving over 20 mph (32 km/h) for the light to turn OFF after you have filled your tires to the recommended inflation pressure.

How temperature affects your tire pressure

The Tire Pressure Monitoring System (TPMS) monitors tire pressure in each pneumatic tire. While driving in a normal manner, a typical passenger tire inflation pressure may increase approximately 2 to 4 psi (14 to 28 kPa) from a cold start situation. If the vehicle is stationary over night with the outside temperature significantly lower than the daytime temperature, the tire pressure may decrease approximately 3 psi (20.7 kPa) for a drop of 30° F (16.6°C) in ambient temperature. This lower pressure value may be detected by the TPMS as being significantly lower than the recommended inflation pressure and activate the TPMS warning for low tire pressure. If the low tire pressure warning light is ON, visually check each tire to verify that no tire is flat. (If one or more tires are flat, repair as necessary.) Check air pressure in the road tires. If any tire is under-inflated, carefully drive the vehicle to the nearest location where air can be added to the tires. Inflate all the tires to the recommended inflation pressure.