REPORT NUMBER 138-STF-10-002

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

FORD MOTOR COMPANY
2010 FORD TAURUS
FOUR-DOOR PASSENGER CAR
NHTSA NO. CA0211

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

MAY 18, 2010

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 2010 Ford Taurus four-door passenger car in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure Number TP-138-03 for the determination of FMVSS 138 compliance. Test failures identified were as follows: None		
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INTRODUCTION

1.1 PURPOSE OF COMPLIANCE TEST

A 2010 Ford Taurus four-door passenger car 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 2010 Ford Taurus four-door passenger car. Nomenclatures applicable to the test vehicle are:

A. Vehicle Identification Number: 1FAHP2DW1AG132689

B. NHTSA Number: CA0211

C Manufacturer: Ford Motor Company

D. Manufacture Date: 12/2009

1.3 TEST DATE

The test vehicle was tested during the time period April 9 through April 21, 2010.

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 and vehicle labeling information were 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 Taurus. 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. Right front 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 front
E. Left rear and right front
F. Left front, 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. 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: April 9 – April 21, 2010 LAB: U.S. DOT San Angelo Test Facility

VIN: 1FAHP2DW1AG132689 VEHICLE NHTSA NUMBER: CA0211

CERTIFICATION LABEL BUILD DATE: 12/2009

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

REMARKS: None

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

TEST DATE: April 9, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211 VIN: 1FAHP2DW1AG132689

CERTIFICATION LABEL BUILD DATE: 12/2009 ENGINE: 3.5 liter, V6

MY/MAKE/MODEL/BODY STYLE: 2010 Ford Taurus four-door passenger car

TIRE CONDITIONING:

(X) Tires used more than 100 km. Actual odometer reading : 269 km (169 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; receiver: Ford

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

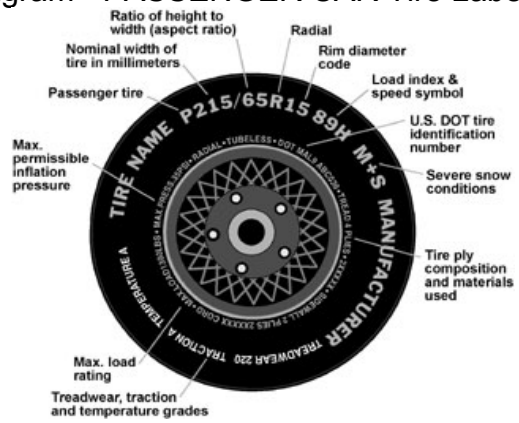
DATA SHEET 1 (Sheet 2 of 3)
TEST PREPARATION INFORMATION

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

Axle	Tire Size	Recommended Cold Inflation Pressure	Source
Front	P235/60R17	260 kPa (38 psi)	Vehicle placard
Rear	P235/60R17	260 kPa (38 psi)	Vehicle placard

INSTALLED TIRE DATA

Diagram - PASSENGER CAR Tire Labeling



Front and Rear Axles

Tire Size and Load Index / Speed Rating: P235/60R17 100T

Manufacturer/Tire Name: Hankook Optimo H725

Sidewall Max Load Rating: 800 kg (1,764 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 polyester, 2 steel, 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	260 kPa x .75 = 195 kPa	260 kPa x .75 = 195 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)	195 kPa (28 psi)	195 kPa (28 psi)
(D) Pressure at which to deflate tire(s) = (C) – 7 kPa	188 kPa (27 psi)	188 kPa (27 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	260, 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	260	35
Load Range E	550	80	260	35

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 9, 2010

APPROVED BY: Kenneth H. Yates

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

TEST DATE: April 9, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

TPMS Low Tire Pressure Warning Telltale

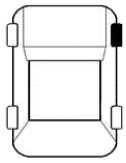
Telltale is mounted inside the occupant compartment in front of and in clear view of the driver?

(X)YES ( )NO (fail)

TPMS Low Tire Pressure Warning Telltale Location: Instrument panel between 'PRNDL' display and temperature gauge

Identify Telltale Symbol Used (check box above figure).

[X] 

[ ] 

[ ] OTHER (fail)
(describe below)

Note any words or additional symbols used:

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:

LOW TIRE PRESSURE WARNING AND MALFUNCTION TELLTALE

Ignition locking system position when telltale illuminates:

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

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

Time telltale remains illuminated 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: Todd P. Groghan DATE: April 9, 2010

APPROVED BY: Kenneth H. Yates

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

TEST DATE: April 12, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

Time:	Start:	8:35 am	End:	9:40 am
Ambient Temperature:	Start:	19.0°C (66.2°F)	End:	20.0°C (68.0°F)
Trip Odometer Reading:	Start:	274 km (170 mi)		
Fuel Level:	Start:	Full		
Weather Conditions:		Overcast		

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

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	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)
Tire Sidewall Temp	20.2°C (68.4°F)	20.4°C (68.7°F)	20.6°C (69.1°F)	20.2°C (68.4°F)

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

VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: 2,386 kg (5,260 lbs)

GAWR (front): 1,279 kg (2,820 lbs)

GAWR (rear): 1,143 kg (2,520 lbs)

Vehicle Capacity Weight:

Vehicle Capacity Weight 430 kg (950 lbs)

Measured Unloaded Vehicle Weight:

LF	547 kg (1,205 lbs)	LR	353 kg (778 lbs)
RF	538 kg (1,187 lbs)	RR	352 kg (777 lbs)
Front Axle	1,085 kg (2,392 lbs)	Rear Axle	705 kg (1,555 lbs)

Total Vehicle 1,790 kg (3,947 lbs)

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

LF	594 kg (1,310 lbs)		LR	396 kg (873 lbs)	
RF	584 kg (1,287 lbs)		RR	396 kg (873 lbs)	
Front Axle	1,178 kg (2,597 lbs)	(≤ GAWR)	Rear Axle	792 kg (1,746 lbs)	(≤ GAWR)

Total Vehicle 1,970 kg (4,343 lbs) (not greater than GVWR)

Note: For scenarios A through C, and G, this Total Vehicle Weight measures the vehicle loaded to Lightly Loaded Vehicle Weight (LLVW), 180 kg (396 lbs) of driver, passenger, and test equipment.

RECORDED BY: Todd P. Groghan DATE: April 12, 2010

APPROVED BY: Kenneth H. Yates

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

SCENARIO A – Right Front Tire Deflation at LLVW

TEST DATE: April 15, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

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 LLVW, positioning vehicle at selected test start point, and vehicle cool down period: Ambient Temperature: 17.5°C (63.5°F) Vehicle cool down period: overnight				
Inflation Pressure	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)
Tire Sidewall Temp	18.2°C (64.8°F)	18.2°C (64.8°F)	18.2°C (64.8°F)	18.4°C (65.1°F)
San Angelo Test Facility Shop Floor Temp	18.6°C (65.5°F)	18.6°C (65.5°F)	18.6°C (65.5°F)	18.6°C (65.5°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	13:18:58 UTC	End:	13:43:45 UTC
Trip Odometer Reading:	Start:	274.9 km (170.8 mi)	End:	306.4 km (190.4 mi)
Ambient Temperature:	Start:	17.5°C (63.5°F)	End:	17.6°C (63.7°F)
Roadway Temperature:	Start:	17.8°C (64.0°F)	End:	17.6°C (63.7°F)

Driving in first direction:

Starting point: Goodfellow Air Force Base (GAFB) north gate Direction: see chart, page 62

10:14 minutes (stopwatch time) 15.6 km (9.7 mi) distance

Driving in opposite direction:

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

10:22 minutes (stopwatch time) 15.9 km (9.9 mi) distance

Max speed: 99.5 km/h (61.8 mph)

Total Driving Time: 20:36 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	278.0 kPa (40.3 psi)	275.1 kPa (39.9 psi)	273.2 kPa (39.6 psi)	277.4 kPa (40.2 psi)
Tire Sidewall Temp	26.2°C (79.2°F)	23.8°C (74.8°F)	24.0°C (75.2°F)	28.2°C (82.8°F)
San Angelo Test Facility Shop Floor Temp	18.4°C (65.1°F)	18.6°C (65.5°F)	18.4°C (65.1°F)	18.6°C (65.5°F)

SYSTEM DETECTION PHASE:

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

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Indicate Location of Tire(s) Deflated: ( )LF ( )LR ( )RR (X)RF Inflation Pressure				188.0 kPa (27.3 psi)

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop Direction: see chart, page 63

15.1 km (9.4 mi) distance

Max speed: 97.1 km/h (60.3 mph)

Total Driving Time: 10:07 minutes (VBox time)

TEST RESULTS

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: 18.5°C (65.3°F)	Vehicle cool down period: 60 minutes			
Inflation Pressure	270.0 kPa (39.2 psi)	266.3 kPa (38.6 psi)	265.0 kPa (38.4 psi)	183.1 kPa (26.6 psi)
Tire Sidewall Temp	23.8°C (74.8°F)	21.6°C (70.9°F)	21.6°C (70.9°F)	23.6°C (74.5°F)
San Angelo Test Facility Shop Floor Temp	18.6°C (65.5°F)	18.6°C (65.5°F)	18.8°C (65.8°F)	18.8°C (65.8°F)

After the cool down period of a minimum of one hour, 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:	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)

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

Starting point: San Angelo Test Facility shop

2:13 minutes (stopwatch time – non-cumulative) 0.3 km (0.2 mi) distance

TEST RESULTS

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

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 15, 2010

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 19, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

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 LLVW, positioning vehicle at selected test start point, and vehicle cool down period: Ambient Temperature: 13.7°C (56.7°F) Vehicle cool down period: overnight				
Inflation Pressure	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)
Tire Sidewall Temp	14.8°C (58.6°F)	14.6°C (58.3°F)	14.8°C (58.6°F)	14.8°C (58.6°F)
San Angelo Test Facility Shop Floor Temp	15.8°C (60.4°F)	16.2°C (61.2°F)	16.2°C (61.2°F)	16.2°C (61.2°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	13:03:18 UTC	End:	13:28:00 UTC
Trip Odometer Reading:	Start:	330.9 km (205.6 mi)	End:	362.4 km (225.2 mi)
Ambient Temperature:	Start:	13.7°C (56.7°F)	End:	12.8°C (55.0°F)
Roadway Temperature:	Start:	15.6°C (60.1°F)	End:	14.4°C (57.9°F)

Driving in first direction:

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

10:13 minutes (stopwatch time) 15.6 km (9.7 mi) distance

Driving in opposite direction:

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

10:18 minutes (stopwatch time) 15.9 km (9.9 mi) distance

Max speed: 100.0 km/h (62.1 mph)

Total Driving Time: 20:34 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	277.2 kPa (40.2 psi)	275.4 kPa (39.9 psi)	274.2 kPa (39.8 psi)	276.7 kPa (40.1 psi)
Tire Sidewall Temp	21.6°C (70.9°F)	19.2°C (66.6°F)	19.4°C (66.9°F)	22.6°C (72.7°F)
San Angelo Test Facility Shop Floor Temp	14.6°C (58.3°F)	15.0°C (59.0°F)	15.2°C (59.4°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 ( )LR (X)RR (X)RF Inflation Pressure			188.0 kPa (27.3 psi)	188.0 kPa (27.3 psi)

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop Direction: see chart, page 65

15.4 km (9.6 mi) distance

Max speed: 99.5 km/h (61.8 mph)

Total Driving Time: 10:02 minutes (VBox time)

TEST RESULTS

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: 14.7°C (58.5°F)	Vehicle cool down period: 61 minutes			
Inflation Pressure	270.2 kPa (39.2 psi)	267.6 kPa (38.8 psi)	183.3 kPa (26.6 psi)	184.2 kPa (26.7 psi)
Tire Sidewall Temp	21.4°C (70.5°F)	19.2°C (66.6°F)	18.2°C (64.8°F)	21.6°C (70.9°F)
San Angelo Test Facility Shop Floor Temp	16.8°C (62.2°F)	16.6°C (61.9°F)	16.6°C (61.9°F)	16.6°C (61.9°F)

After the cool down period of a minimum of one hour, 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:	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)

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

Starting point: San Angelo Test Facility shop

0:56 minutes (stopwatch time – non-cumulative) 0.3 km (0.2 mi) distance

TEST RESULTS

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

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 19, 2010

APPROVED BY: Kenneth H. Yates

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

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

TEST DATE: April 19, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

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 LLVW, positioning vehicle at selected test start point, and vehicle cool down period: Ambient Temperature: 15.7°C (60.3°F) Vehicle cool down period: 62 minutes				
Inflation Pressure	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)
Tire Sidewall Temp	20.6°C (69.1°F)	18.2°C (64.8°F)	17.8°C (64.0°F)	20.8°C (69.4°F)
San Angelo Test Facility Shop Floor Temp	16.6°C (61.9°F)	17.2°C (63.0°F)	17.2°C (63.0°F)	17.2°C (63.0°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	16:27:26 UTC	End:	16:52:27 UTC
Trip Odometer Reading:	Start:	388.0 km (241.1 mi)	End:	419.6 km (260.7 mi)
Ambient Temperature:	Start:	15.7°C (60.3°F)	End:	16.6°C (61.9°F)
Roadway Temperature:	Start:	23.6°C (74.5°F)	End:	23.0°C (73.4°F)

Driving in first direction:

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

10:13 minutes (stopwatch time) 15.6 km (9.7 mi) distance

Driving in opposite direction:

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

10:23 minutes (stopwatch time) 15.9 km (9.9 mi) distance

Max speed: 99.4 km/h (61.8 mph)

Total Driving Time: 20:35 minutes (VBox time)

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

SCENARIO C – Left Front, Left Rear, 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	275.7 kPa (40.0 psi)	275.9 kPa (40.0 psi)	275.3 kPa (39.9 psi)	275.1 kPa (39.9 psi)
Tire Sidewall Temp	26.6°C (79.9°F)	24.2°C (75.6°F)	24.4°C (75.9°F)	27.6°C (81.7°F)
San Angelo Test Facility Shop Floor Temp	15.6°C (60.1°F)	16.4°C (61.5°F)	16.6°C (61.9°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 (X)LR (X)RR (X)RF Inflation Pressure	188.0 kPa (27.3 psi)	188.0 kPa (27.3 psi)	188.0 kPa (27.3 psi)	188.0 kPa (27.3 psi)

TELLTALE ILLUMINATION:

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

15.4 km (9.6 mi) distance (non-cumulative)

Max speed: 100.1 km/h (62.2 mph)

Total Driving Time: 10:02 minutes (VBox time)

TEST RESULTS

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, 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: 17.0°C (62.6°F)	Vehicle cool down period: 60 minutes			
Inflation Pressure	183.1 kPa (26.6 psi)	183.3 kPa (26.6 psi)	182.8 kPa (26.5 psi)	183.6 kPa (26.6 psi)
Tire Sidewall Temp	23.6°C (74.5°F)	21.6°C (70.9°F)	21.4°C (70.5°F)	23.6°C (74.5°F)
San Angelo Test Facility Shop Floor Temp	16.8°C (62.2°F)	17.2°C (63.0°F)	17.4°C (63.3°F)	17.2°C (63.0°F)

After the cool down period of a minimum of one hour, 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:	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)

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

Starting point: San Angelo Test Facility shop

1:50 minutes (stopwatch time – non-cumulative) 0.3 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: Todd P. Groghan DATE: April 19, 2010

APPROVED BY: Kenneth H. Yates

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

TEST DATE: April 20, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

Time:	Start:	6:55 am	End:	8:25 am
Ambient Temperature:	Start:	12.9°C (55.2°F)	End:	12.9°C (55.2°F)
Odometer Reading:	Start:	489 km (303.6 mi)		
Fuel Level:	Start:	Full		
Weather Conditions:		Cloudy and calm		

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

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	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)
Tire Sidewall Temp	14.6°C (58.3°F)	14.4°C (57.9°F)	14.8°C (58.6°F)	14.8°C (58.6°F)

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

VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: 2,386 kg (5,260 lbs)

GAWR (front): 1,279 kg (2,820 lbs)

GAWR (rear): 1,143 kg (2,520 lbs)

Vehicle Capacity Weight:

Vehicle Capacity Weight 430 kg (950 lbs)

Measured Unloaded Vehicle Weight:

LF	547 kg (1,205 lbs)	LR	353 kg (779 lbs)
RF	539 kg (1,188 lbs)	RR	352 kg (775 lbs)
Front Axle	1,086 kg (2,393 lbs)	Rear Axle	705 kg (1,554 lbs)

Total Vehicle 1,791 kg (3,947 lbs)

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

LF	601 kg (1,325 lbs)		LR	515 kg (1,135 lbs)	
RF	593 kg (1,308 lbs)		RR	512 kg (1,129 lbs)	
Front Axle	1,194 kg (2,633 lbs)	(≤ GAWR)	Rear Axle	1,027 kg (2,264 lbs)	(≤ GAWR)

Total Vehicle 2,221 kg (4,897 lbs) (not greater than GVWR)

Note: For scenarios D through F, this Total Vehicle Weight measures the vehicle loaded to Unloaded Vehicle Weight (UVW) and Vehicle Capacity Weight (VCW), 430 kg (950 lbs) of driver, passenger, test equipment, and ballast.

RECORDED BY: Todd P. Groghan DATE: April 20, 2010

APPROVED BY: Kenneth H. Yates

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

SCENARIO D – Left Front Tire Deflation at UVW + VCW

TEST DATE: April 20, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

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: 15.2°C (59.4°F) Vehicle cool down period: 67 minutes				
Inflation Pressure	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)
Tire Sidewall Temp	21.4°C (70.5°F)	18.8°C (65.8°F)	19.6°C (67.3°F)	21.8°C (71.2°F)
San Angelo Test Facility Shop Floor Temp	16.4°C (61.5°F)	16.4°C (61.5°F)	17.0°C (62.6°F)	16.4°C (61.5°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	16:21:43 UTC	End:	16:46:18 UTC
Trip Odometer Reading:	Start:	544.4 km (338.3 mi)	End:	576.1 km (358.0 mi)
Ambient Temperature:	Start:	15.2°C (59.4°F)	End:	15.7°C (60.3°F)
Roadway Temperature:	Start:	25.6°C (78.1°F)	End:	25.6°C (78.1°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 68

10:10 minutes (stopwatch time) 15.6 km (9.7 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 68

10:23 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 98.9 km/h (61.5 mph)

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

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

SCENARIO D – Left 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	274.8 kPa (39.9 psi)	277.4 kPa (40.2 psi)	277.7 kPa (40.3 psi)	272.5 kPa (39.5 psi)
Tire Sidewall Temp	29.0°C (84.2°F)	27.6°C (81.7°F)	27.2°C (81.0°F)	27.8°C (82.0°F)
San Angelo Test Facility Shop Floor Temp	15.8°C (60.4°F)	16.2°C (61.2°F)	16.4°C (61.5°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: (X)LF ( )LR ( )RR ( )RF Inflation Pressure	188.0 kPa (27.3 psi)			

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop Direction: see chart, page 69

15.3 km (9.5 mi) distance (non-cumulative)

Max speed: 98.4 km/h (61.1 mph)

Total Driving Time: 10:02 minutes (VBox time)

TEST RESULTS

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 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: 18.6°C (65.5°F)	Vehicle cool down period: 61 minutes			
Inflation Pressure	184.3 kPa (26.7 psi)	265.8 kPa (38.6 psi)	265.5 kPa (38.5 psi)	264.8 kPa (38.4 psi)
Tire Sidewall Temp	20.4°C (68.7°F)	21.4°C (70.5°F)	24.2°C (75.6°F)	25.8°C (78.4°F)
San Angelo Test Facility Shop Floor Temp	18.2°C (64.8°F)	18.0°C (64.4°F)	18.2°C (64.8°F)	17.6°C (63.7°F)

After the cool down period of a minimum of one hour, 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:	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)

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

Starting point: San Angelo Test Facility shop

0:51 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TEST RESULTS

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

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 20, 2010

APPROVED BY: Kenneth H. Yates

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

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

TEST DATE: April 21, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

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: 15.0°C (59.0°F) Vehicle cool down period: overnight minutes				
Inflation Pressure	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)
Tire Sidewall Temp	15.2°C (59.4°F)	15.2°C (59.4°F)	15.4°C (59.7°F)	15.8°C (60.4°F)
San Angelo Test Facility Shop Floor Temp	16.2°C (61.2°F)	16.6°C (61.9°F)	16.8°C (62.2°F)	16.8°C (62.2°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	13:11:32 UTC	End:	13:36:06 UTC
Trip Odometer Reading:	Start:	615.6 km (382.5 mi)	End:	647.1 km (402.1 mi)
Ambient Temperature:	Start:	15.0°C (59.0°F)	End:	16.2°C (61.2°F)
Roadway Temperature:	Start:	14.4°C (57.9°F)	End:	16.6°C (61.9°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 70

10:12 minutes (stopwatch time) 15.6 km (9.7 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 70

10:20 minutes (stopwatch time) 15.9 km (9.9 mi) distance

Max speed: 100.0 km/h (62.1 mph)

Total Driving Time: 20:31 minutes (VBox time)

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

SCENARIO E – Left Rear, 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	281.8 kPa (40.9 psi)	281.9 kPa (40.9 psi)	282.6 kPa (41.0 psi)	281.0 kPa (40.8 psi)
Tire Sidewall Temp	29.0°C (84.2°F)	26.8°C (80.2°F)	25.8°C (78.4°F)	26.8°C (80.2°F)
San Angelo Test Facility Shop Floor Temp	16.6°C (61.9°F)	16.6°C (61.9°F)	17.4°C (63.3°F)	16.8°C (62.2°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 ( )RR (X)RF Inflation Pressure		188.0 kPa (27.3 psi)		188.0 kPa (27.3 psi)

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop Direction: see chart, page 71

15.4 km (9.6 mi) distance (non-cumulative)

Max speed: 99.4 km/h (61.8 mph)

Total Driving Time: 10:03 minutes (VBox time)

TEST RESULTS

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 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: 19.0°C (66.2°F)	Vehicle cool down period: 62 minutes			
Inflation Pressure	271.6 kPa (39.4 psi)	180.2 kPa (26.1 psi)	269.5 kPa (39.1 psi)	184.3 kPa (26.7 psi)
Tire Sidewall Temp	22.4°C (72.3°F)	20.8°C (69.4°F)	22.2°C (72.0°F)	24.6°C (76.3°F)
San Angelo Test Facility Shop Floor Temp	18.6°C (65.5°F)	18.2°C (64.8°F)	18.8°C (65.8°F)	18.8°C (65.8°F)

After the cool down period of a minimum of one hour, 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:	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 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) 0.3 km (0.2 mi) distance

TEST RESULTS

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

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 21, 2010

APPROVED BY: Kenneth H. Yates

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

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

TEST DATE: April 21, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

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: 22.0°C (71.6°F) Vehicle cool down period: 64 minutes				
Inflation Pressure	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)
Tire Sidewall Temp	23.0°C (73.4°F)	21.6°C (70.9°F)	21.6°C (70.9°F)	23.6°C (74.5°F)
San Angelo Test Facility Shop Floor Temp	19.2°C (66.6°F)	19.2°C (66.6°F)	19.2°C (66.6°F)	19.2°C (66.6°F)

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	16:37:00 UTC	End:	17:01:29 UTC
Trip Odometer Reading:	Start:	671.4 km (417.2 mi)	End:	703.0 km (436.8 mi)
Ambient Temperature:	Start:	22.0°C (71.6°F)	End:	22.6°C (72.7°F)
Roadway Temperature:	Start:	35.4°C (95.7°F)	End:	35.4°C (95.7°F)

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 72

10:11 minutes (stopwatch time) 15.6 km (9.7 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 72

10:27 minutes (stopwatch time) 15.9 km (9.9 mi) distance

Max speed: 99.8 km/h (62.0 mph)

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

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

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

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	281.8 kPa (40.9 psi)	282.9 kPa (41.0 psi)	284.4 kPa (41.2 psi)	281.4 kPa (40.8 psi)
Tire Sidewall Temp	36.4°C (97.5°F)	33.6°C (92.5°F)	33.6°C (92.5°F)	35.2°C (95.4°F)
San Angelo Test Facility Shop Floor Temp	18.2°C (64.8°F)	18.6°C (65.5°F)	18.8°C (65.8°F)	18.8°C (65.8°F)

SYSTEM DETECTION PHASE:

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

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Indicate Location of Tire(s) Deflated: (X)LF ( )LR (X)RR (X)RF Inflation Pressure	188.0 kPa (27.3 psi)		188.0 kPa (27.3 psi)	188.0 kPa (27.3 psi)

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop Direction: see chart, page 73

15.4 km (9.6 mi) distance (non-cumulative)

Max speed: 99.2 km/h (61.6 mph)

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

TEST RESULTS

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

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

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

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

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

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After vehicle cool down period: Ambient Temperature: 25.4°C (77.7°F)	Vehicle cool down period: 63 minutes			
Inflation Pressure	181.6 kPa (26.3 psi)	268.7 kPa (39.0 psi)	179.9 kPa (26.1 psi)	182.7 kPa (26.5 psi)
Tire Sidewall Temp	29.8°C (85.6°F)	27.0°C (80.6°F)	27.8°C (82.0°F)	31.2°C (88.2°F)
San Angelo Test Facility Shop Floor Temp	20.6°C (69.1°F)	21.2°C (70.2°F)	21.6°C (70.9°F)	21.0°C (69.8°F)

After the cool down period of a minimum of one hour, 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:	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)	260.0 kPa (37.7 psi)

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

Starting point: San Angelo Test Facility shop

1:15 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

TEST RESULTS

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

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 21, 2010

APPROVED BY: Kenneth H. Yates

DATA SHEET 4 (Sheet 1 of 4)
Scenario G – Malfunction Detection Test at LLVW - Spare Installed on Right Front

TEST DATE: April 19, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

Time:	Start:	19:03:04 UTC	End:	19:24:29 UTC
Trip Odometer Reading:	Start:	444.3 km (276.1 mi)	End:	470.3 km (292.2 mi)
Ambient Temperature:	Start:	17.1°C (62.8°F)	End:	17.1°C (62.8°F)
Roadway Temperature:	Start:	24.8°C (76.6°F)	End:	24.6°C (76.3°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. (See Figure 5.19.)

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 74

25.9 km (16.1 mi) distance

Max speed: 99.7 km/h (62.0 mph)
Total Driving Time: 16:15 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 - Spare Installed on Right Front

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 3 seconds

Time telltale remains flashing 73 seconds

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

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

Extinguishment Phase:

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

Driving in first direction:

Starting point: San Angelo Test Facility shop

0.2 km (0.1 mi) distance

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

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

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 19, 2010

APPROVED BY: Kenneth H. Yates

DATA SHEET 4 (Sheet 3 of 4)
Scenario H – Malfunction Detection Test - TPMS Fuse Removal

TEST DATE: April 15, 2010 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: CA0211

Time:	Start:	1:20 pm	End:	1:25 pm
Odometer Reading:	Start:	330.2 km (205.2 mi)	End:	330.2 km (205.2 mi)
Ambient Temperature:	Start:	17.6°C (63.7°F)	End:	17.6°C (63.7°F)
Roadway Temperature:	Start:	NA	End:	NA
Fuel Level:	Start:	Full		

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

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

METHOD OF MALFUNCTION SIMULATION:

Describe method of malfunction simulation: Fuse #5 for TPMS module was removed from under-dash fuse panel. (See Figure 5.20.)

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

Combination Malfunction Telltale

Illumination upon start-up - driving was not necessary.

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

DATA SHEET 4 (Sheet 4 of 4)
Scenario H – Malfunction Detection Test - TPMS Fuses Removed

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 5 seconds (lamp check)

Time telltale remains flashing 72 seconds

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

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

Extinguishment Phase:

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

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

TPMS MALFUNCTION PERFORMANCE TEST RESULTS (PASS/FAIL) **PASS**
TPMS fuse was removed.

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 15, 2010

APPROVED BY: Kenneth H. Yates

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

TEST DATE: April 9, 2010 LAB: San Angelo Test Facility VEHICLE NHTSA NO: CA0211

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?

- ☑ 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: Todd P. Groghan DATE: April 9, 2010

APPROVED BY: Kenneth H. Yates

SECTION 4

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

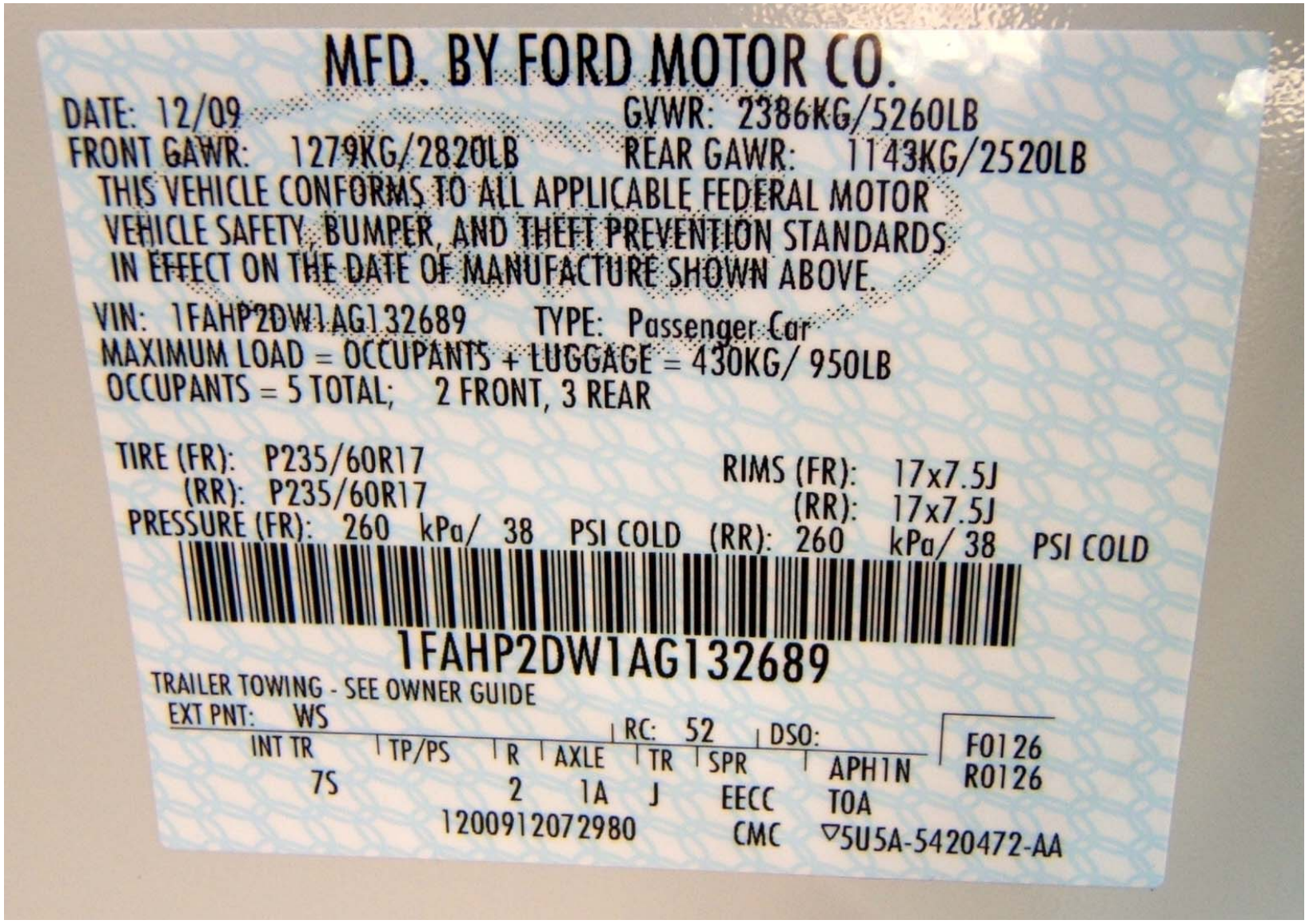
EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO	CAL. DATE	NEXT CAL. DATE
STOPWATCH	CHAMPION SPORTS TIMER	910 R	N/A	N/A
VBOX RECORDING DEVICE	RACELOGIC VBOX III	SERIAL # 030209	2/3/2010	2/3/2011
AMBIENT TEMPERATURE GAUGE	FLUKE 179 DIGITAL THERMOMETER	SERIAL # 84740316	2/24/2010	2/24/2011
LASER TEMPERATURE GAUGE (TIRES AND GROUND)	RAYTEK ST20	SERIAL 2065640101-0014	8/19/2009	8/19/2010
AIR PRESSURE GAUGE	ASHCROFT GENERAL PURPOSE DIGITAL GAUGE	MODEL # D1005PS 02L 100 PSI SERIAL # 20017398-01	12/9/2009	12/9/2010
FLOOR SCALES (VEHICLE)	INTERCOMP SW DELUXE SCALES	PART # 100156 SERIAL # 26032382	7/28/2009	7/28/2010

SECTION 5

PHOTOGRAPHS

2010 FORD TAURUS
NHTSA NO. CA0211
FMVSS NO.138

FIGURE 5.1
¾ FRONT VIEW FROM LEFT SIDE OF VEHICLE



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NHTSA NO. CA0211
FMVSS NO.138

FIGURE 5.2
VEHICLE CERTIFICATION LABEL

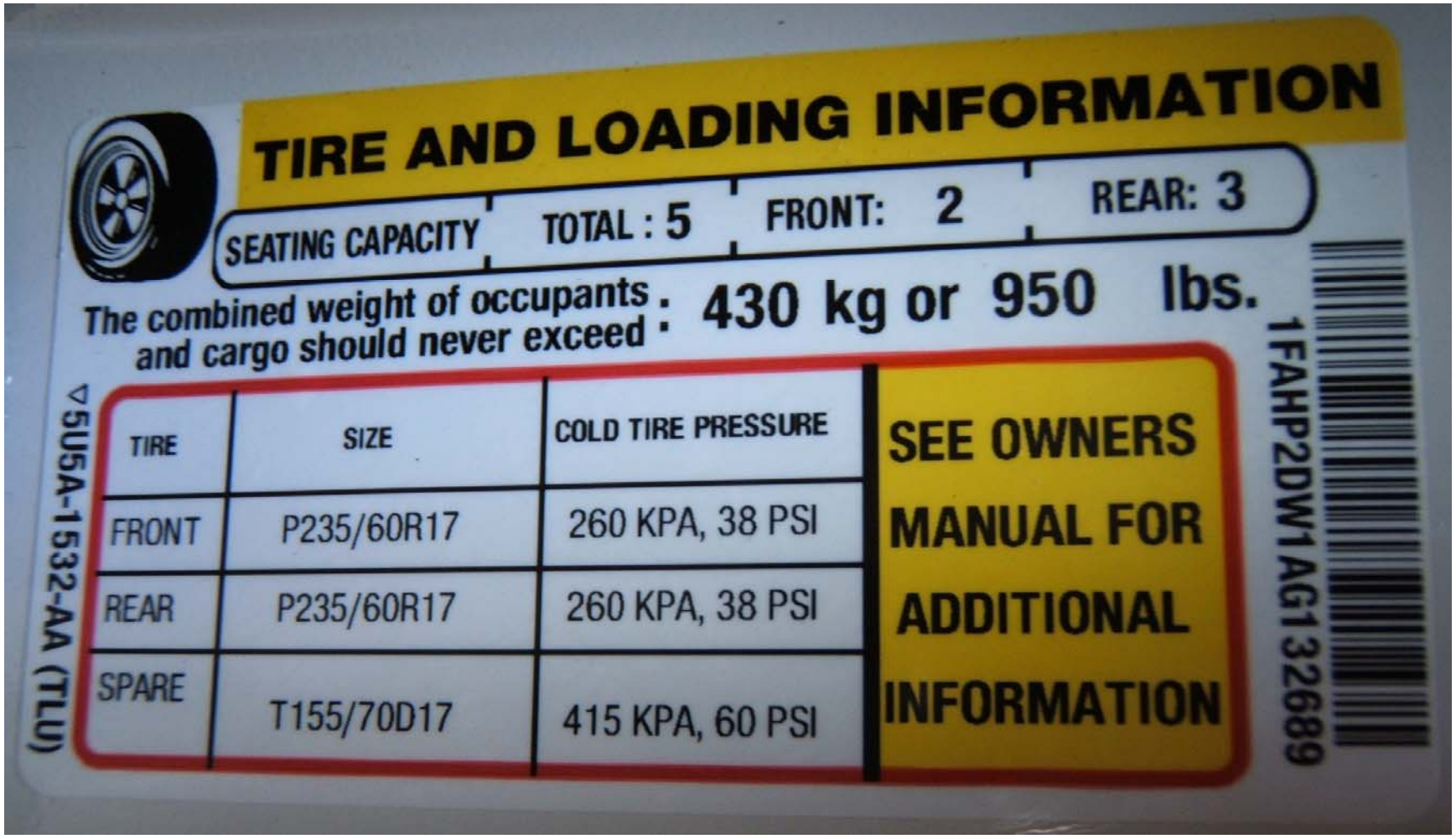

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FIGURE 5.3
VEHICLE PLACARD

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FIGURE 5.4
TIRE SHOWING BRAND

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FIGURE 5.5
TIRE SHOWING MODEL

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FIGURE 5.6
TIRE SHOWING SIZE AND LOAD INDEX / SPEED RATING

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FIGURE 5.7
TIRE SHOWING DOT SERIAL NUMBER

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FMVSS NO. 138

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

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FIGURE 5.9
TIRE SHOWING SIDEWALL / TREAD CONSTRUCTION

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FIGURE 5.10
RIM SHOWING RIM CONTOUR FOR
FULL WIDTH OF CROSS SECTION

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FMVSS NO. 138

FIGURE 5.11
RIM SHOWING TPMS SENSOR

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NHTSA NO. CA0211
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FIGURE 5.12
DISPLAY SHOWING COMBINATION LOW TIRE PRESSURE WARNING / TPMS MALFUNCTION WARNING TELLTALE

2010 FORD TAURUS
NHTSA NO. CA0211
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FIGURE 5.13
MESSAGE CENTER
SHOWING LOW TIRE PRESSURE MESSAGE

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NHTSA NO. CA0211
FMVSS NO 138

FIGURE 5.14
MESSAGE CENTER
SHOWING TPMS MALFUNCTION MESSAGE

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NHTSA NO. CA0211
FMVSS NO 138

FIGURE 5.15
TEST INSTRUMENTATION INSTALLED IN VEHICLE

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NHTSA NO. CA0211
FMVSS NO. 138

FIGURE 5.16
VEHICLE REAR SEAT BALLAST FOR UVW + VCW LOAD

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NHTSA NO. CA0211
FMVSS NO. 138

FIGURE 5.17
VEHICLE CARGO AREA BALLAST FOR UVW + VCW LOAD

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FMVSS NO. 138

FIGURE 5.18
VEHICLE ON WEIGHT SCALES

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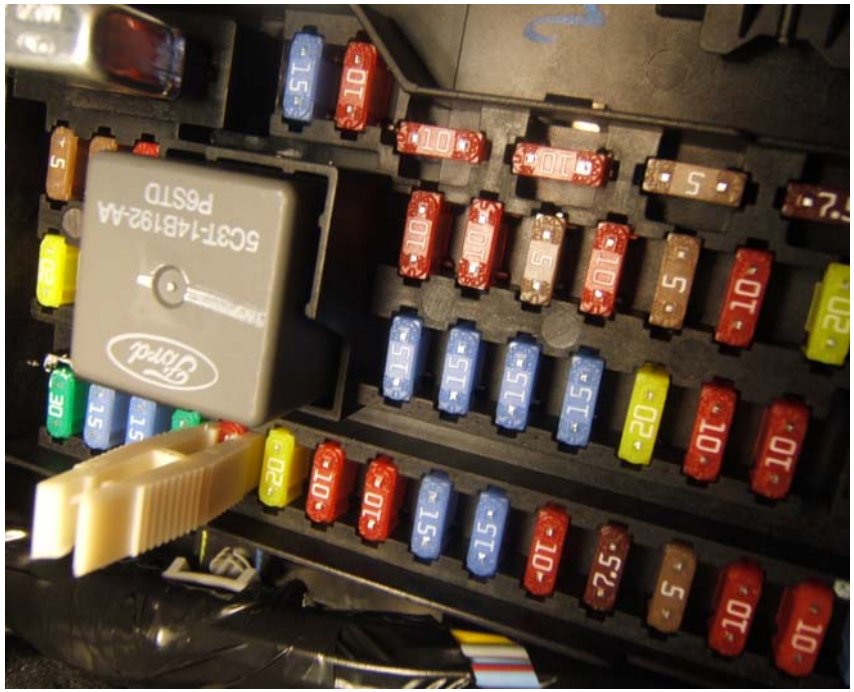
NHTSA NO. CA0211
FMVSS NO. 138

FIGURE 5.19
MALFUNCTION DETECTION TEST 1 -
SPARE INSTALLED ON RIGHT FRONT



2010 FORD TAURUS
NHTSA NO. CA0211
FMVSS NO. 138

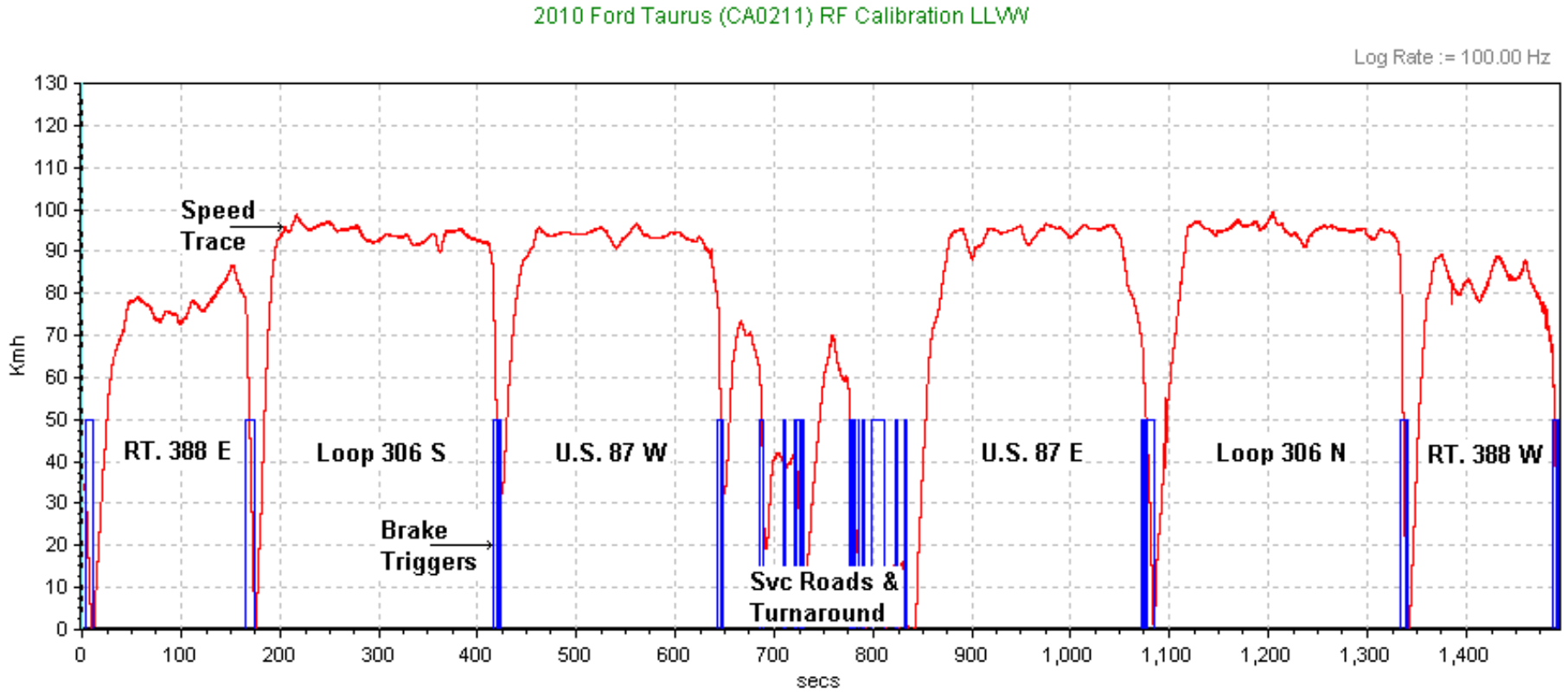
FIGURE 5.20
MALFUNCTION DETECTION TEST 2 -
TPMS FUSE REMOVAL

SECTION 6

TEST PLOTS

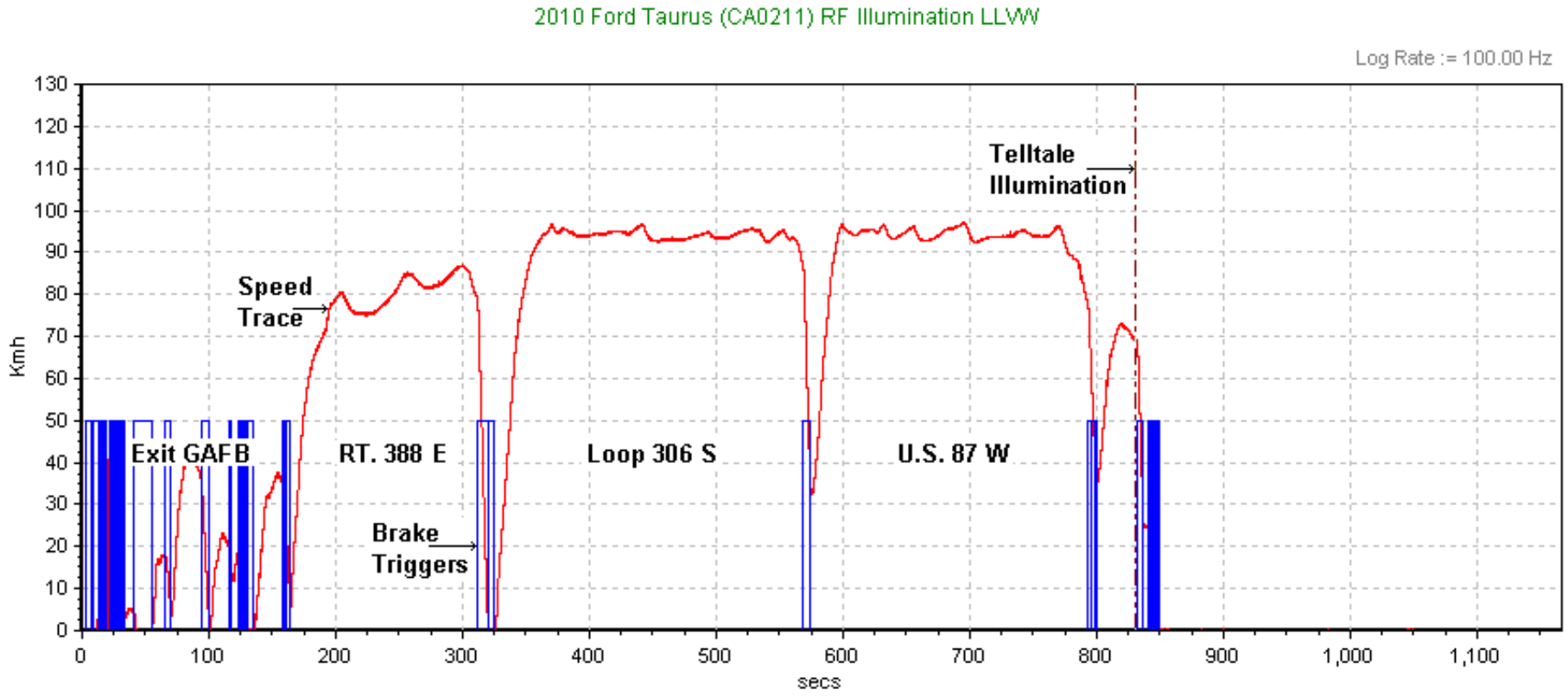
Scenario A: Right Front Tire at LLVW
Test Date: 4/15/10
Data File Time: 24:55 minutes
Cumulative Driving Time: 20:36 minutes
Start Point: GAFB North Gate

Calibration Phase:



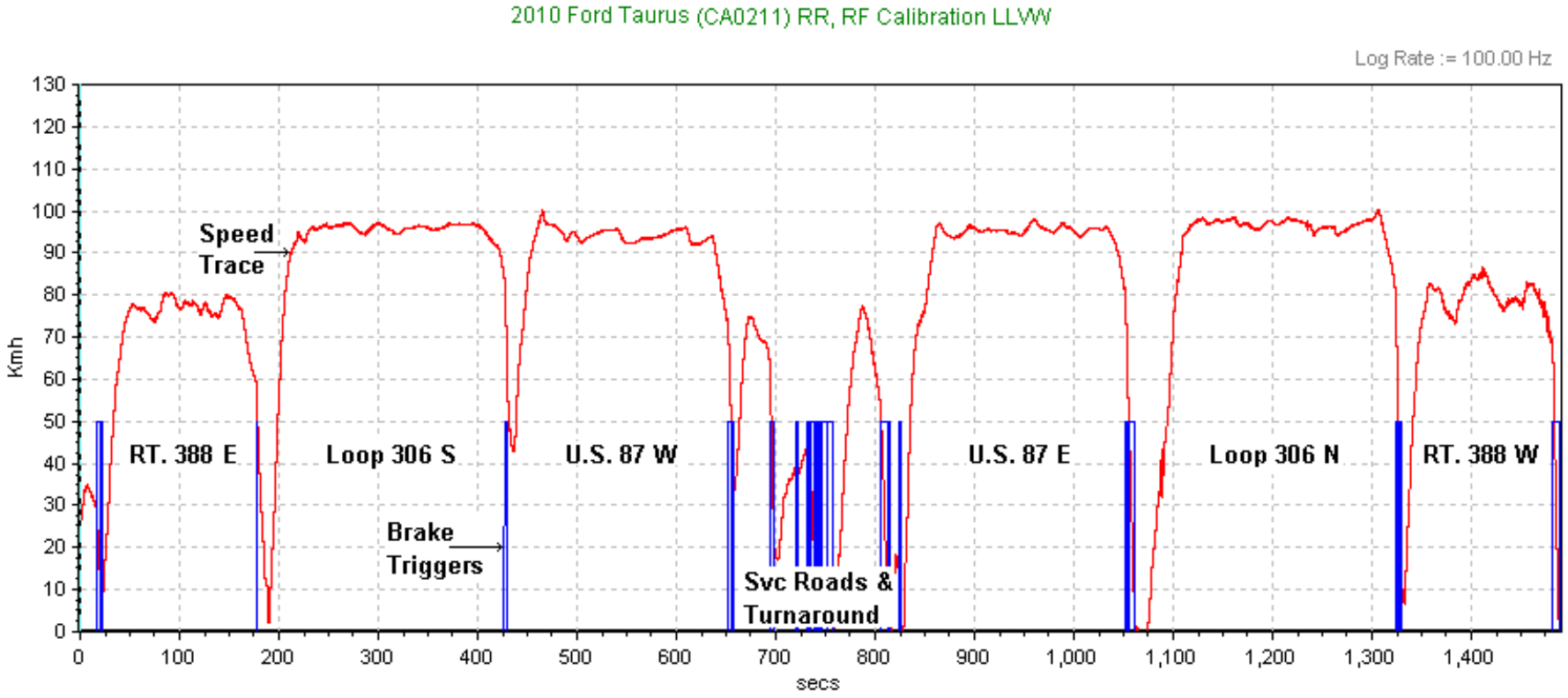
Scenario A:	Right Front Tire at LLVW
Test Date:	4/15/10
Data File Time:	19:27 minutes
Cumulative Driving Time:	10:07 minutes
Start Point:	San Angelo Test Facility shop

Detection Phase:



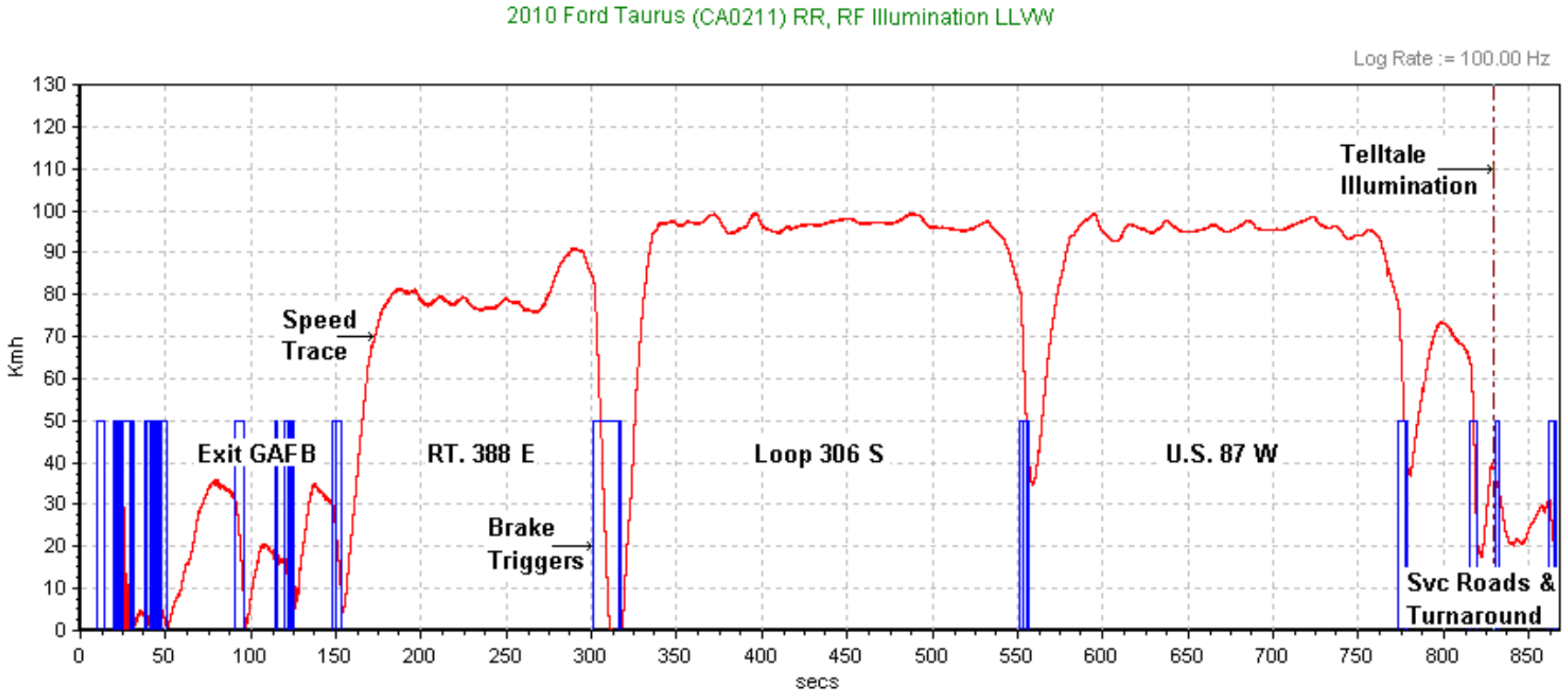
Scenario B:	Right Rear, Right Front Tires at LLVW
Test Date:	4/19/10
Data File Time:	24:51 minutes
Cumulative Driving Time:	20:34 minutes
Start Point:	GAFB North Gate

Calibration Phase:



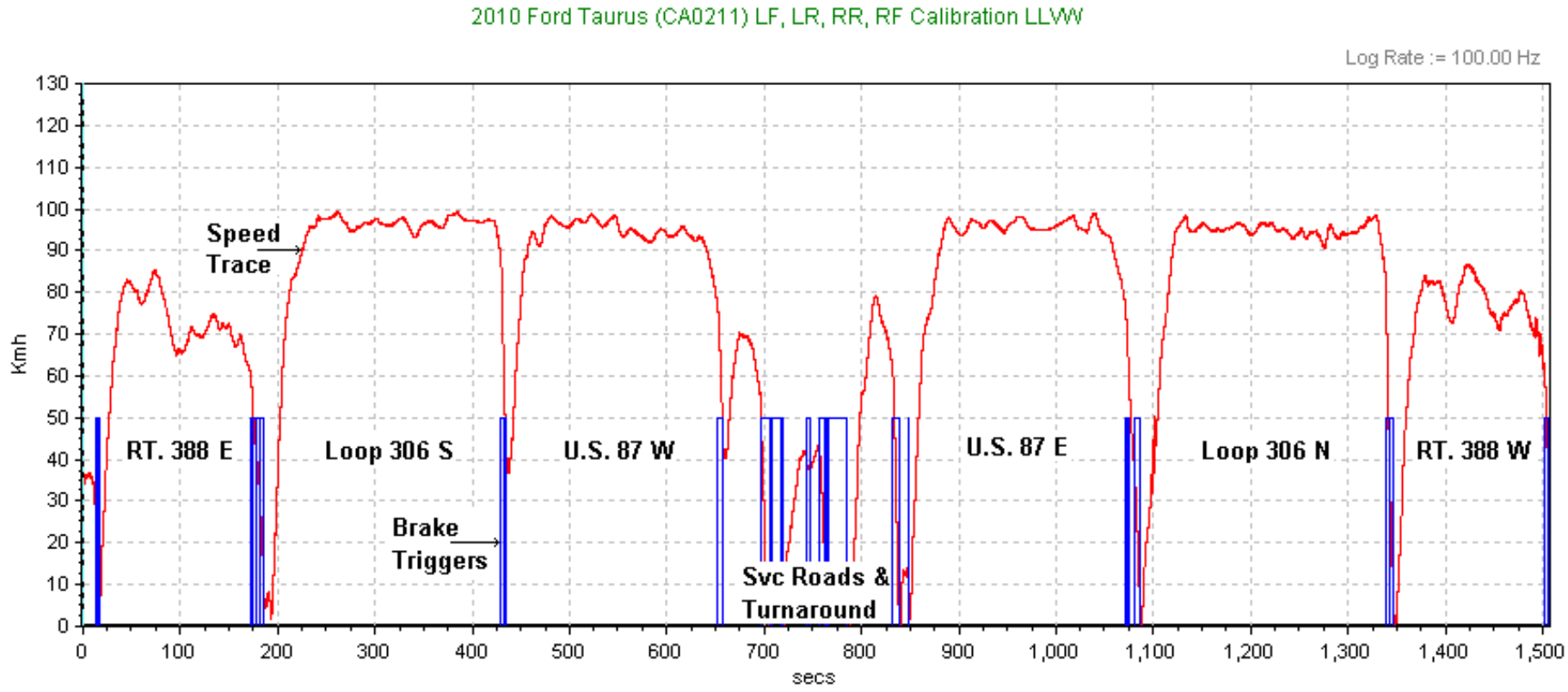
Scenario B: Right Rear, Right Front Tires at LLVW
Test Date: 4/19/10
Data File Time: 14:28 minutes
Cumulative Driving Time: 10:02 minutes
Start Point: San Angelo Test Facility shop

Detection Phase:



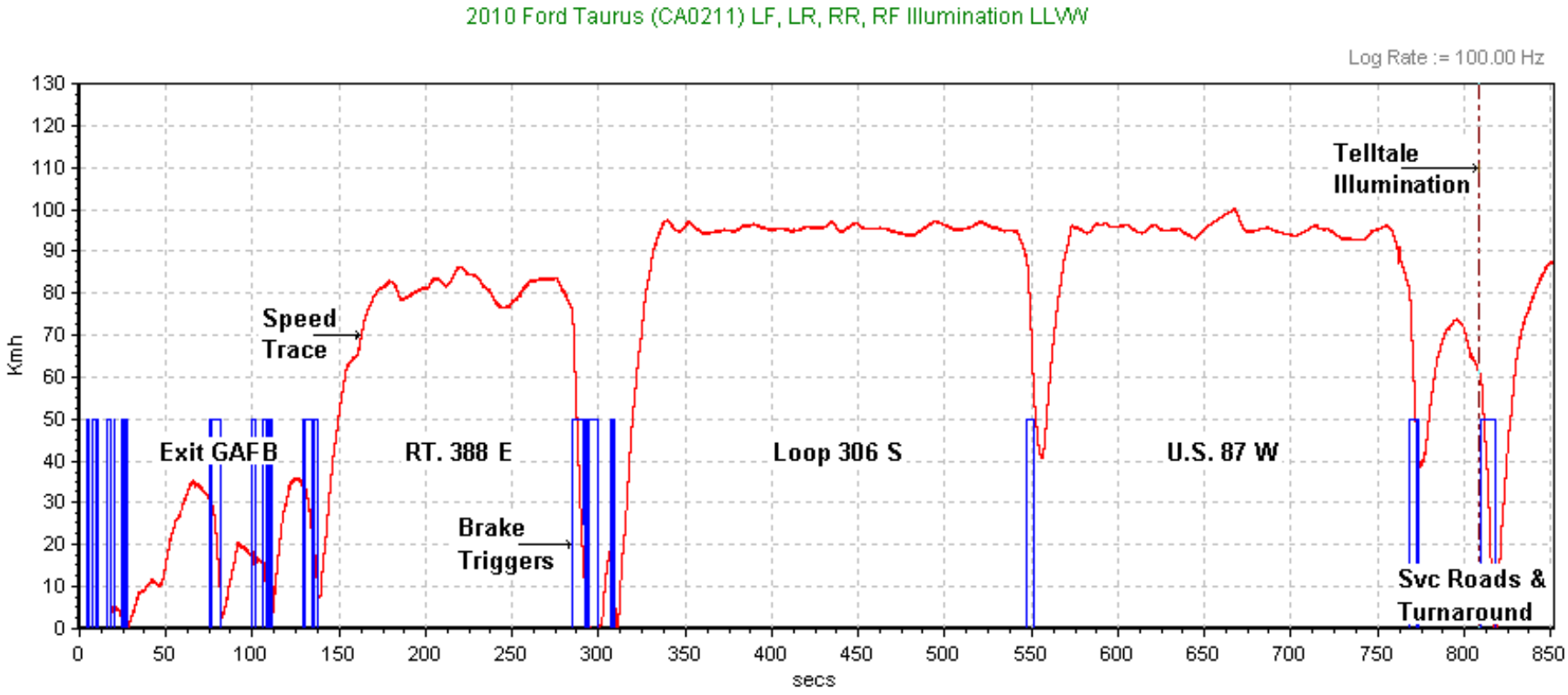
Scenario C:	Left Front, Left Rear, Right Rear, Right Front Tires at LLVW
Test Date:	4/19/10
Data File Time:	25:07 minutes
Cumulative Driving Time:	20:35 minutes
Start Point:	GAFB North Gate

Calibration Phase:



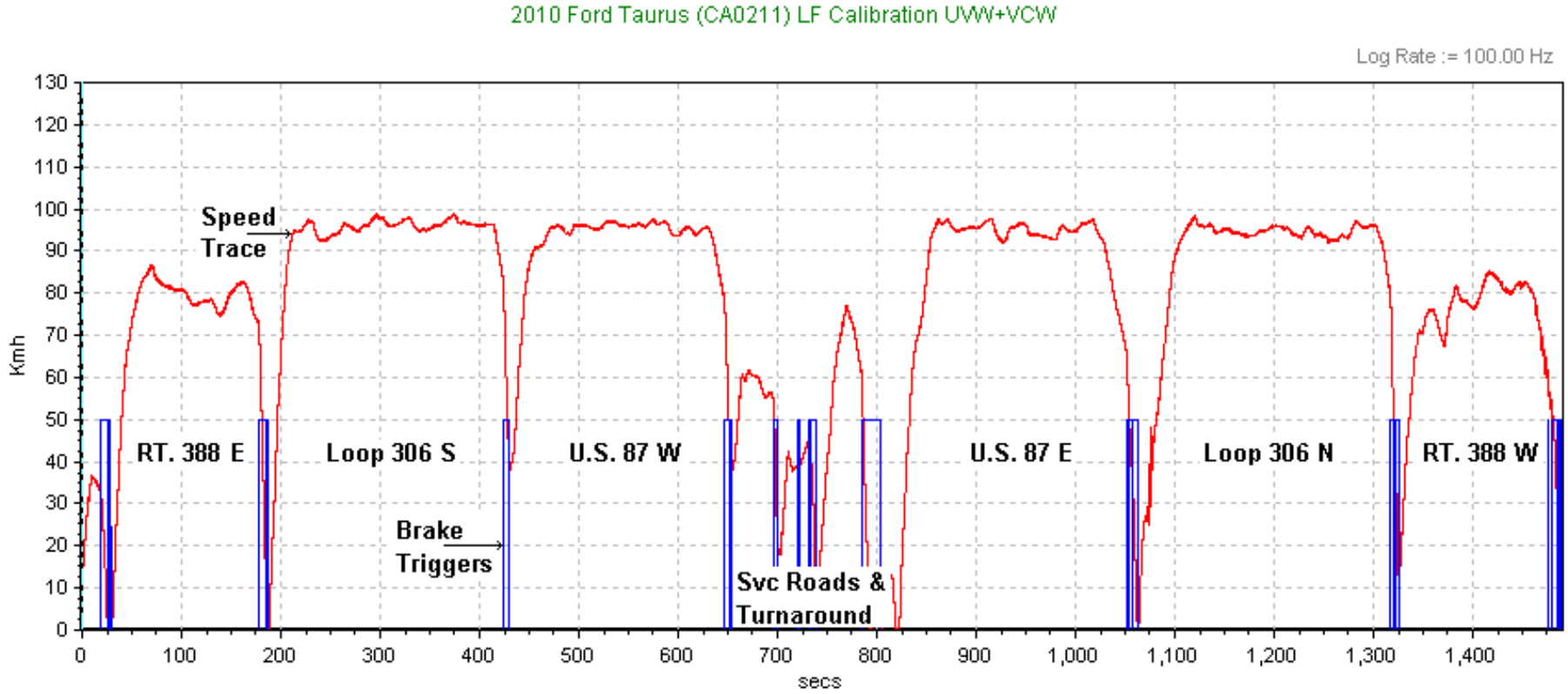
Scenario C:	Left Front, Left Rear, Right Rear, Right Front Tires at LLVW
Test Date:	4/19/10
Data File Time:	14:12 minutes
Cumulative Driving Time:	10:02 minutes
Start Point:	San Angelo Test Facility shop

Detection Phase:



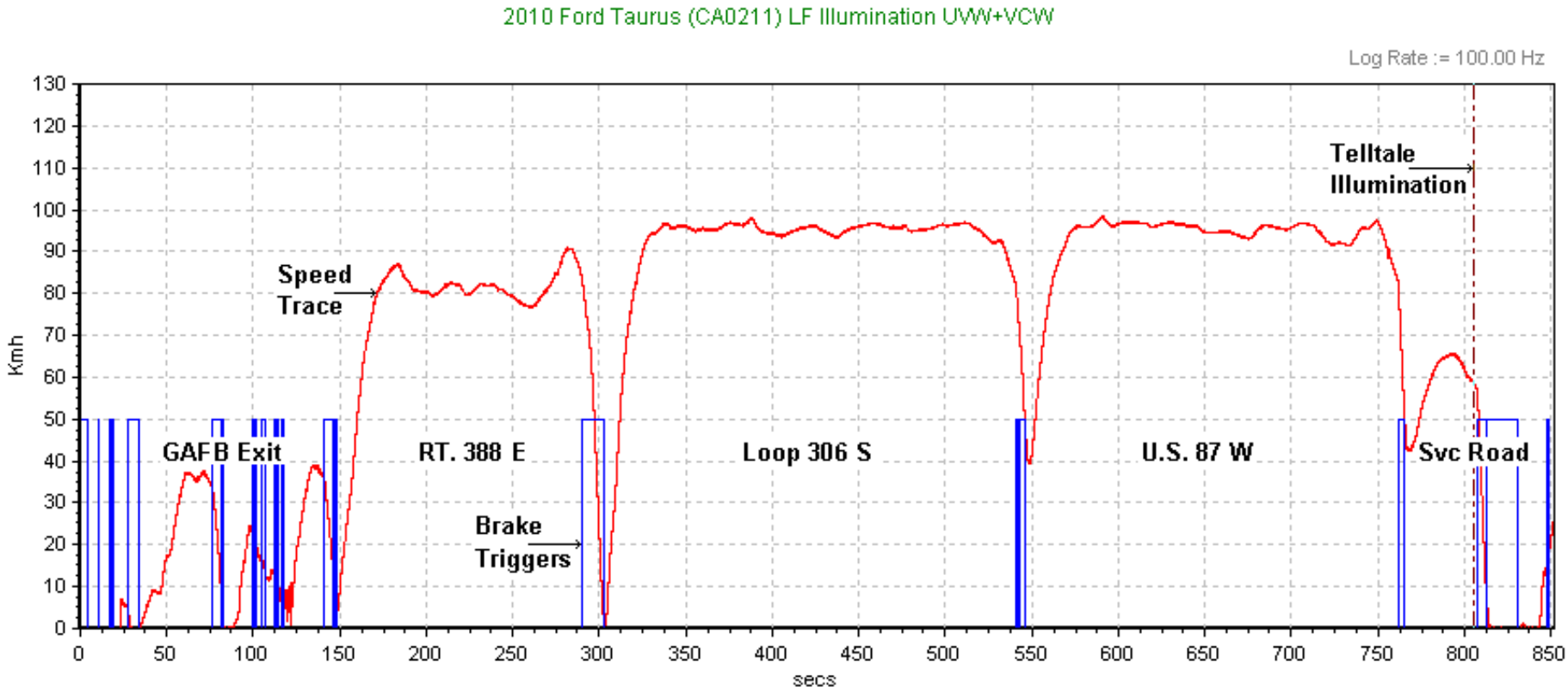
Scenario D: Left Front Tire at UVW + VCW
Test Date: 4/20/10
Data File Time: 24:51 minutes
Cumulative Driving Time: 20:34 minutes
Start Point: GAFB North Gate

Calibration Phase:



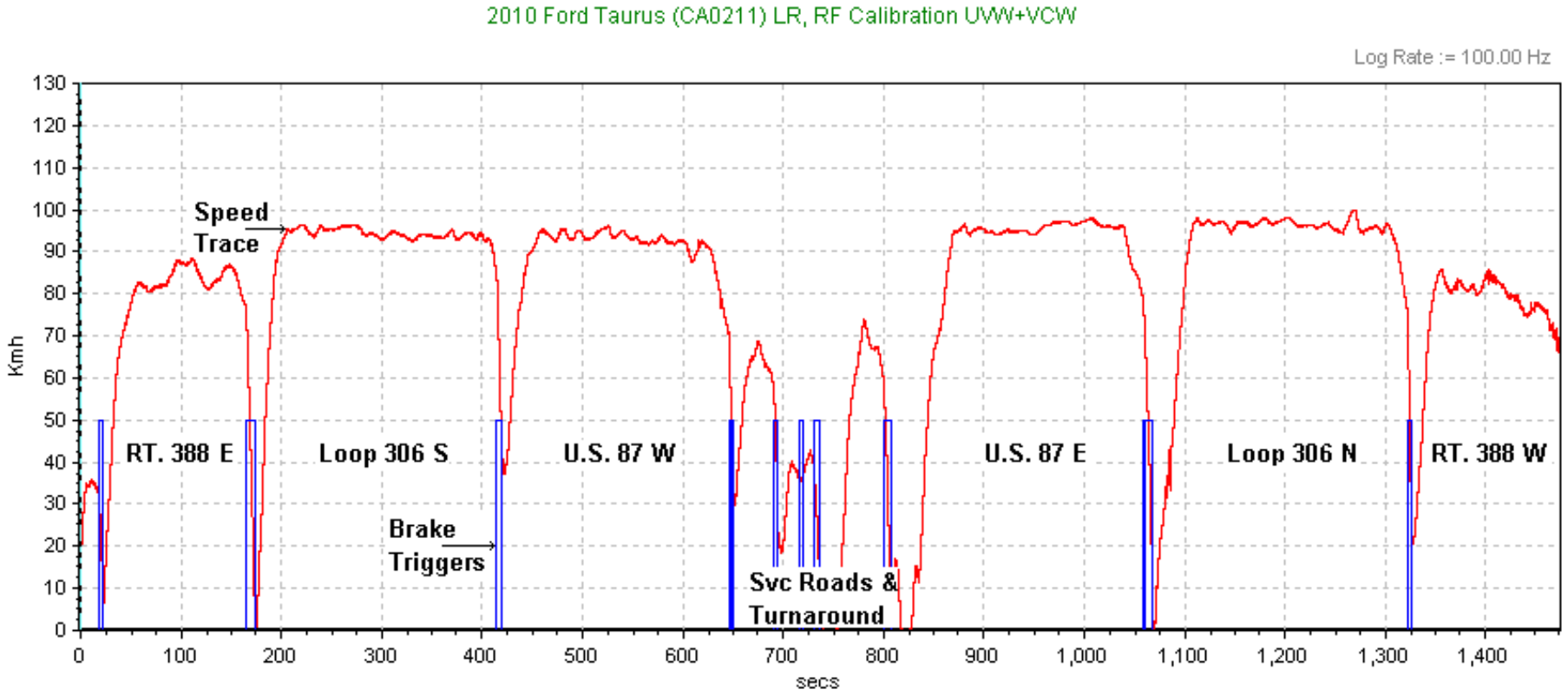
Scenario D: Left Front Tire at UVW + VCW
Test Date: 4/20/10
Data File Time: 14:12 minutes
Cumulative Driving Time: 10:02 minutes
Start Point: San Angelo Test Facility shop

Detection Phase:



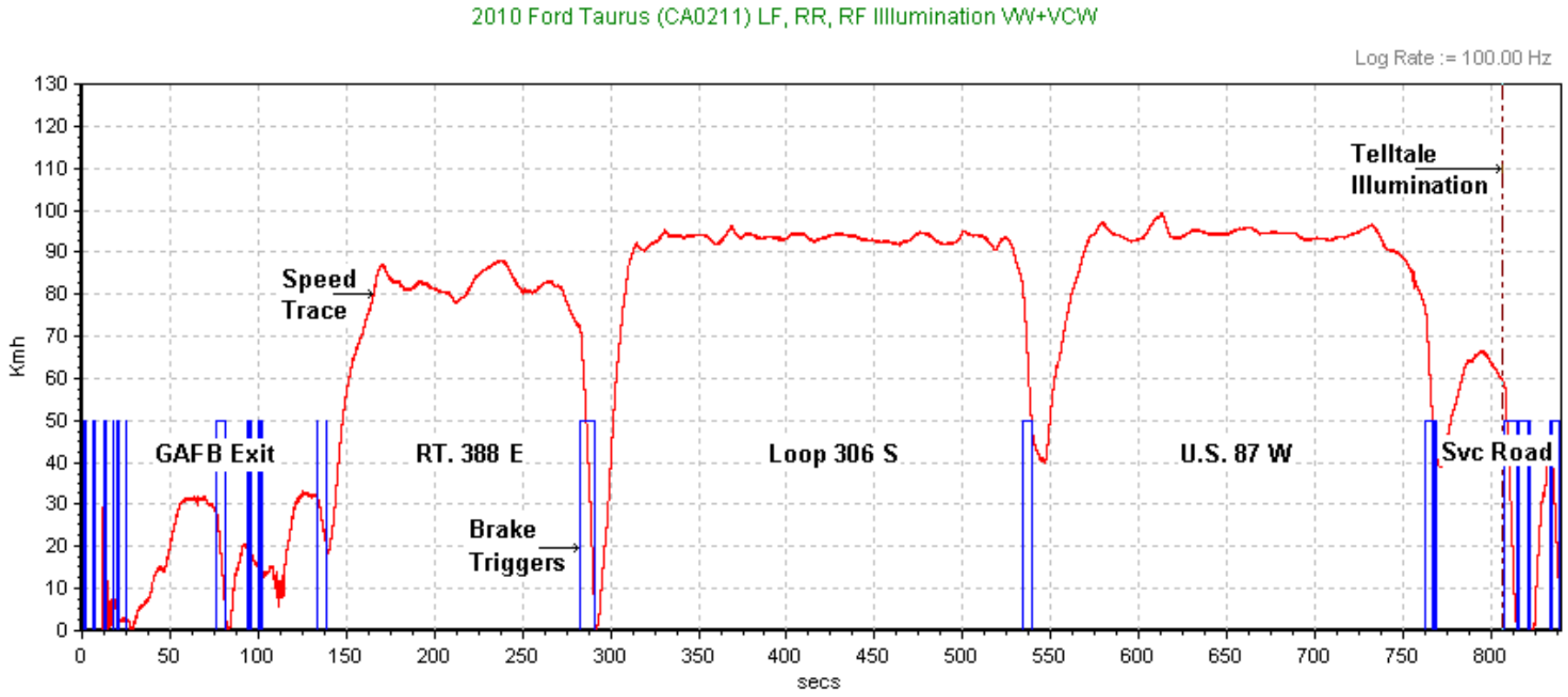
Scenario E: Left Rear, Right Front Tires at UVW + VCW
Test Date: 4/21/10
Data File Time: 24:35 minutes
Cumulative Driving Time: 20:31 minutes
Start Point: GAFB North Gate

Calibration Phase:



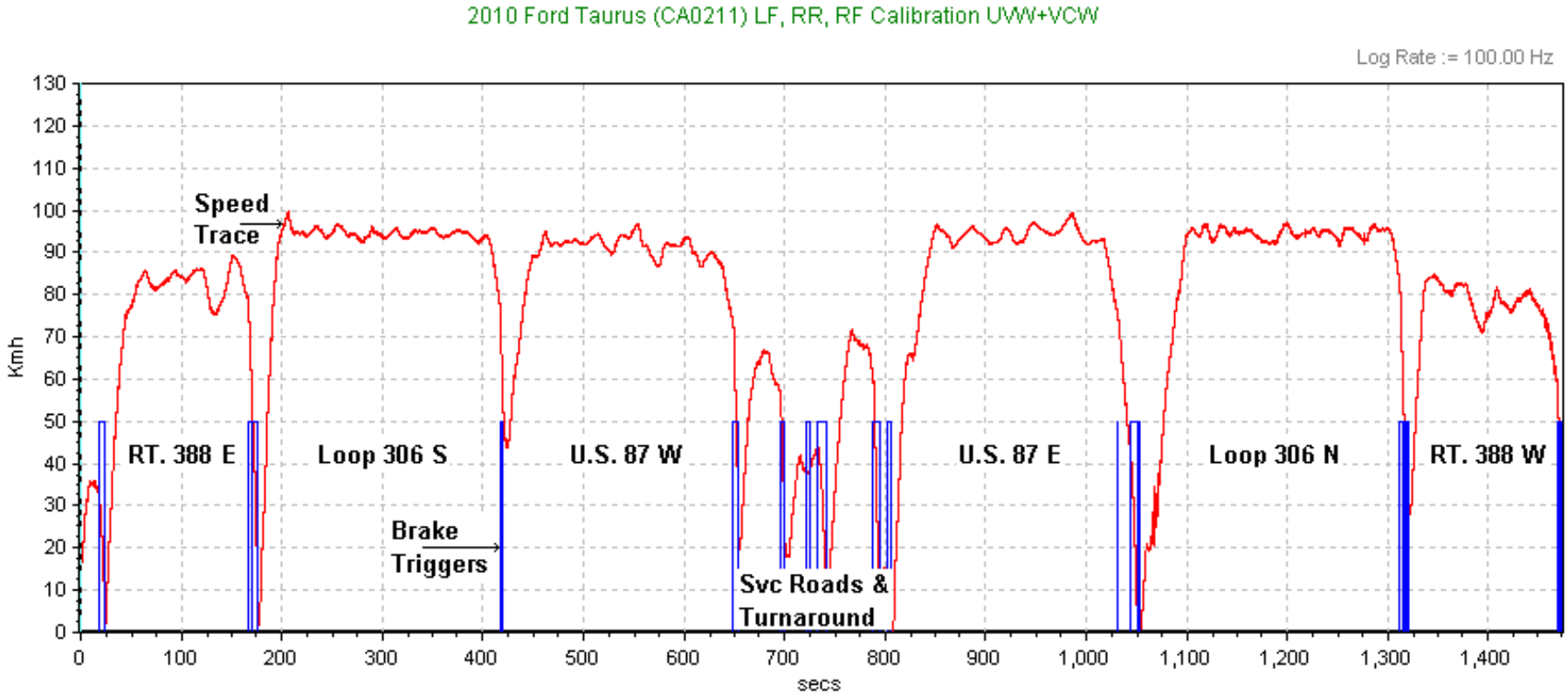
Scenario E: Left Rear, Right Front Tires at UVW + VCW
Test Date: 4/21/10
Data File Time: 14:41 minutes
Cumulative Driving Time: 10:03 minutes
Start Point: San Angelo Test Facility shop

Detection Phase:



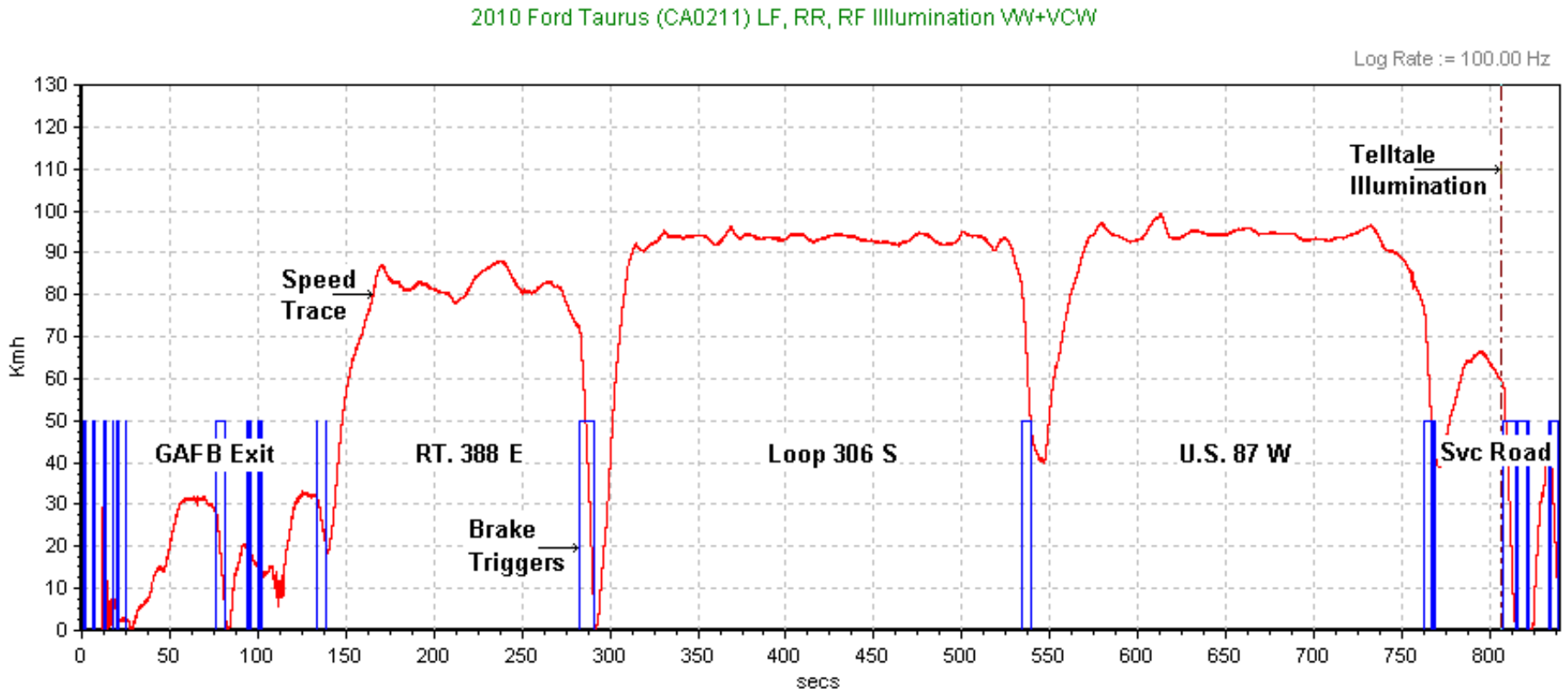
Scenario F:	Left Front, Right Rear, Right Front Tires at UVW + VCW
Test Date:	4/21/10
Data File Time:	24:35 minutes
Cumulative Driving Time:	20:39 minutes
Start Point:	GAFB North Gate

Calibration Phase:



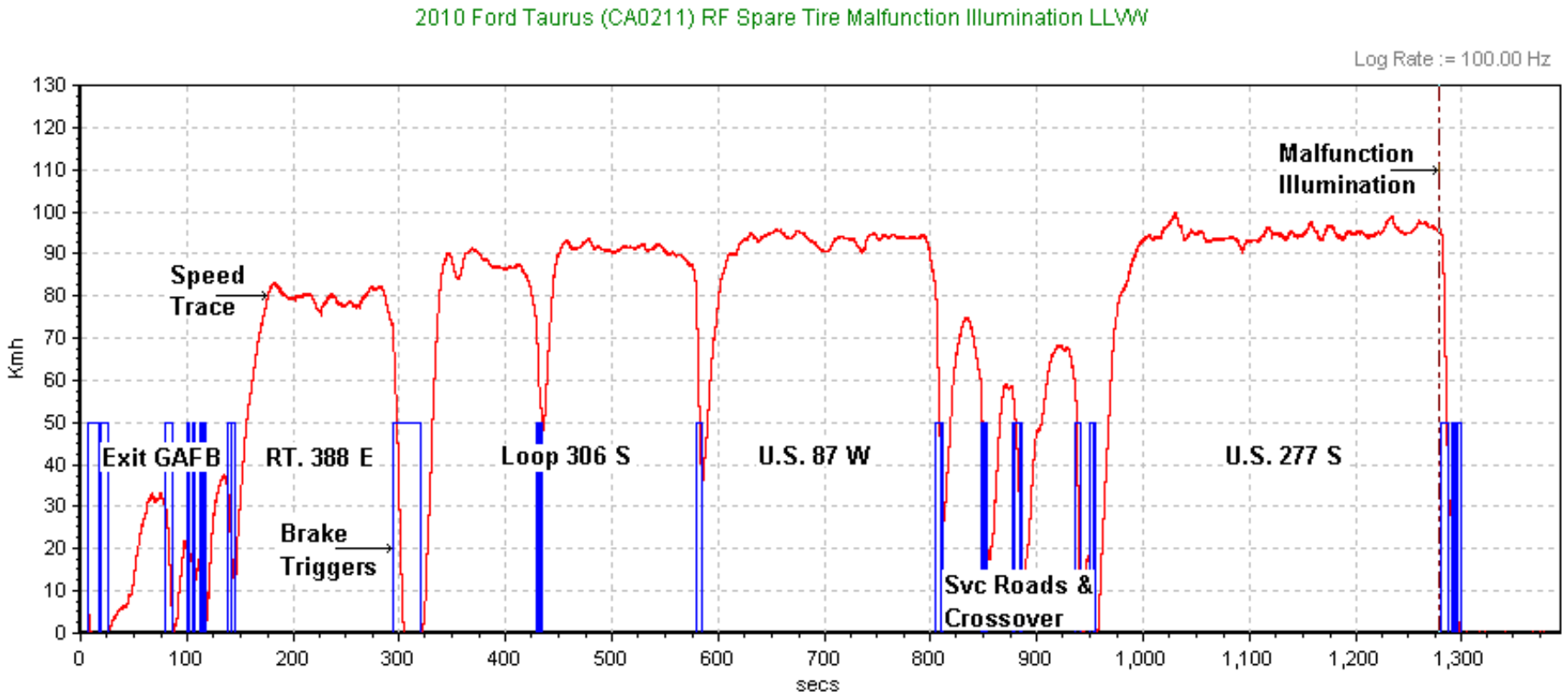
Scenario F: Left Front, Right Rear, Right Front Tires at UVW + VCW
Test Date: 4/21/10
Data File Time: 14:00 minutes
Cumulative Driving Time: 10:11 minutes
Start Point: San Angelo Test Facility shop

Detection Phase:



Scenario G:	Malfunction Detection Test at UVW + VCW
Test Date:	4/19/10
Data File Time:	23:13 minutes
Cumulative Driving Time:	16:15 minutes
Start Point:	San Angelo Test Facility shop

Malfunction Telltale Illumination:



SECTION 7

OWNER'S MANUAL PAGES

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.

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.checkmytires.org for additional information.

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 *Inflating your tires* 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 *When your temporary spare tire is installed* 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.

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 *When your temporary spare tire is installed* 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 (21 kPa) for a drop of 30°F (17°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.