REPORT NUMBER 138-STF-20-005

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

NISSAN MOTOR CO., LTD
2020 NISSAN SENTRA SV
FOUR-DOOR PASSENGER CAR
NHTSA NO. C20205203

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

April 30, 2020

FINAL REPORT

PREPARED FOR

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
NEF-200
OFFICE OF VEHICLE SAFETY COMPLIANCE
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Technical Report Documentation Page

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SECTION 1

INTRODUCTION

1.1 PURPOSE OF COMPLIANCE TEST

This testing was conducted as part of the Department of Transportation, National Highway Traffic Safety Administration's Federal Motor Vehicle Safety Standard (FMVSS) No. 138, "Tire Pressure Monitoring Systems" Compliance Program. The purpose of the test was to determine if the 2020 Nissan Sentra SV supplied by the Office of Vehicle Safety Compliance satisfies the requirements of TP-138-04 dated August 28, 2017.

1.2 TEST VEHICLE

The test vehicle was a 2020 Nissan Sentra SV. Nomenclatures applicable to the test vehicle are:

A. Vehicle Identification Number: 3N1AB8CV4LY207783

B. NHTSA Number: C20205203

C. Manufacturer: Nissan Motor Co., LTD.

D. Manufacture Date: 01/2020

1.3 TEST DATE

The test vehicle was tested April 13 thru April 29, 2020

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 UVW and the weights of the driver, test equipment, and cargo ballast as applicable. The vehicle was loaded to its UVW plus Vehicle Capacity Weight (VCW) for two additional tire deflation scenarios. The VCW included the weights of the driver, test equipment, ballast in the front passenger seat, the mid seat, the rear seat, and the rear cargo area as applicable. 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 3iSL 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 Cumulative Driving Time'.

The low tire pressure test scenarios consisted of five phases, in accordance with FMVSS 138, Test Procedures, Section S6:

1. Lamp Check Phase, S6(a) through (c): With the vehicle stationary and the ignition locking system in the "Lock" or "Off" position, the tires were set at the vehicle's placard cold inflation pressure and the ignition locking system was activated to the "On" ("Run") position. The ignition locking system can also be initially positioned as designated by the manufacturer as a check position. If applicable, the set/reset button was used to reset the TPMS system in accordance with the instructions in the vehicle owner's manual.
2. Calibration Phase, S6(d): The vehicle was driven for at least twenty minutes of cumulative driving time between 50 and 100 km/h. Immediately after, 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.

3. Detection Phase, S6(f): The vehicle was started and driven (if necessary) to ensure that the low inflation pressure telltale illuminated. The test is discontinued if no illumination occurs.
4. Re-illumination Phase, S6(g) through (h): Vehicle was parked in the San Angelo Test Facility (SATF) open bay shielded from direct sunlight and the ignition locking system deactivated to the "Off" or "Lock" position. 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.
5. Extinguishment Phase, S6(i): Tires were adjusted to vehicle placard cold inflation pressure. If the vehicle has a manual reset, the set/reset button was used to reset the TPMS system illumination. The system was reset as required by the owner's manual instructions or manufacturer's supplied information. If necessary, the vehicle was driven to ensure that the TPMS telltale is extinguished.

Five gradual deflation test scenarios, Section 13.4 of Test Procedures of FMVSS 138, followed the steps for the low tire pressure test above except that:

Calibration Phase: The vehicle was driven for 20 to 22 minutes of cumulative driving time between 50 and 100 km/h. Immediately after, the selected tire(s) were deflated to fourteen kPa (two psi) below the Recommended Cold Inflation Pressure(s). After one minute, the inflation pressure(s) of only deflated tire(s) were rechecked and adjusted if necessary.

Detection Phase: The vehicle was started and driven for 20 to 22 minutes at speeds between 50 and 100 km/h to determine if the low inflation pressure telltale illuminated. If no illumination occurred, the selected tire(s) were deflated an additional fourteen kPa (two psi) and after one minute, the pressure(s) were rechecked and adjusted if necessary. The cycle of fourteen kPa deflation was repeated until illumination occurred. Testing would have stopped if illumination had not occurred before deflation pressures reached more than 33% below the manufacturer's recommended cold inflation pressure threshold.

The malfunction scenario performed was: TPMS Left Front Sensor removed at LLVW.

2.2 SUMMARY OF RESULTS

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

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

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

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

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

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

Gradual Deflation 1: Left front
Gradual Deflation 2: Left rear and right front
Gradual Deflation 3: Left front, left rear, and right rear

Two gradual deflation scenarios were performed on the test vehicle at UVW+VCW:

Gradual Deflation 4: Right rear
Gradual Deflation 5: Right rear and right front

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

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

Malfunction 1: TPMS Left Front Sensor removed

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

Malfunction 2: N/A, conditions for second malfunction would not allow for vehicle startup and testing

The data indicates that the vehicle's TPMS meets the malfunction requirements.

*An approved alternative route was used for FMVSS 138 testing due to the closing of the North Gate by GAFB. The alternative route was evaluated and verified to produce equivalent scenarios as the original route prior to testing.

SECTION 3

TEST DATA

FMVSS No. 138 – TEST DATA SUMMARY

TEST DATES: April 13 thru April 29, 2020

LAB: U.S. DOT San Angelo Test Facility VEHICLE NHTSA NUMBER: C20205203

VIN: 3N1AB8CV4LY207783 CERTIFICATION LABEL BUILD DATE: 01/2020

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

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

TEST DATE: April 29, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203 VIN: 3N1AB8CV4LY207783

CERTIFICATION LABEL BUILD DATE: 01/2020 ENGINE: 2.0L, 4-cylinder

MY/MAKE/MODEL/BODY STYLE: 2020 Nissan Sentra SV sedan

TIRE CONDITIONING:

(X) Tires used more than 100 km. Actual odometer reading: 66 mi (106.2 km)

VEHICLE ALIGNMENT AND WHEEL BALANCING:

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

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

TPMS IDENTIFICATION:

TPMS MAKE/MODEL: Pacific Gen 2 Snap-In (E-type) #407006LB0B

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

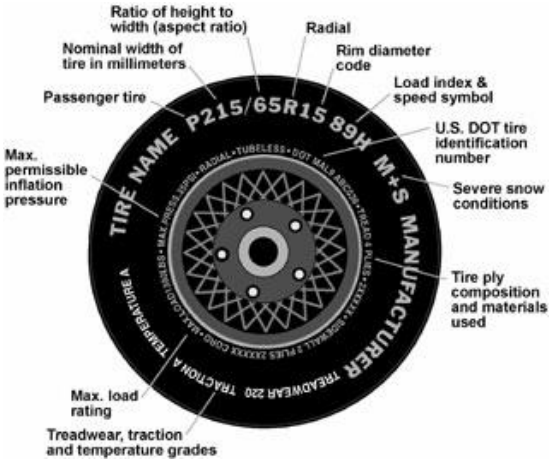
TEST PREPARATION INFORMATION
DATA SHEET 1 (Sheet 2 of 3)

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

Axle	Tire Size	Recommended Cold Inflation Pressure	Source
Front	205/60R16	230 kPa, 33 psi	Vehicle placard
Rear	205/60R16	230 kPa, 33 psi	Vehicle placard
Spare	T125/70D16	420 kPa, 60 psi	Vehicle placard

INSTALLED TIRE DATA

Diagram – Passenger Car Tire Labeling



Front and Rear Axles:

Tire Size and Load Index / Speed Rating: 205/60R16 92 H

Manufacturer/Tire Name: Hankook Kinergy GT

Sidewall Max Load Rating: 630 kg, 1,389 lbs.

Max Inflation Pressure: 350 kPa, 51 psi

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

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

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

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

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

Worksheet for Determining FMVSS No. 138 Telltale Warning Activation Pressure for Tires Installed on Vehicle		
Part	**Front Axle**	**Rear Axle**
(A) Recommended Inflation Pressure x .75	230 kPa x .75 = 172.5 kPa	230 kPa x .75 = 172.5 kPa
(B) Information from FMVSS 138 Table 1 below, Tire types are: Inflation pressure Minimum activation pressures from Table 1	(X) P-metric-Standard load ( ) P-metric-Extra Load Load Range ( ) C, ( ) D, or ( ) E (X) Maximum or ( ) Rated 350 kPa 140 kPa	(X) P-metric-Standard load ( ) P-metric-Extra Load Load Range ( ) C, ( ) D, or ( ) E (X) Maximum or ( ) Rated 350 kPa 140 kPa
(C) Telltale Warning Activation Pressure is the higher of Part (A) or (B)	172.5 kPa	172.5 kPa
(D) Pressure at which to deflate tire(s) = (C) – 7 kPa	165.5 kPa	165.5 kPa

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	230, 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	230	35
Load Range E	550	80	230	35

REMARKS: None

RECORDED BY: Anthony Walden DATE: April 13, 2020

APPROVED BY: Jayton Lindley

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

TEST DATE: April 29, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

TPMS Low Tire Pressure Warning Telltale:

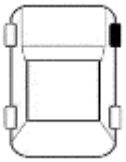
Telltale is mounted inside the occupant compartment in front of and in clear view of the driver?

(X)YES ( )NO (fail)

TPMS Low Tire Pressure Warning Telltale Location: Top center of display

Identify Telltale Symbol Used (check box above figure).

[X] 

[ ] 

[ ] OTHER (fail)
(describe below)

Note any words or additional symbols used: Reconfigurable display with vehicle plan view showing tire positions present. Display also states, “Tire Pressure Low Add Air”

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

TPMS Malfunction Telltale:

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

Note any words or additional symbols used: None

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

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

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

Time telltale remains illuminated 1 seconds.

Starter Interlocks:

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

Describe the interlock features: None

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

REMARKS: None

RECORDED BY: Anthony Walden DATE: April 29, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 1 of 61)

TEST DATE: April 13, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Time: Start: 10:27 am End: 10:57 am

Ambient Temperature: Start: 18.8°C End: 19.4°C

Trip Odometer Reading: Start: 66 mi

Fuel Level: Start: Full

Weather Conditions: Indoors

Time vehicle remained with engine off and tires shielded from direct sunlight (1-hour minimum): 2.5 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	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	18.6°C	17.8°C	18.0°C	18.6°C

VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: (1,815 kg), 4,001 lbs.

GAWR (front): (980 kg), 2,161 lbs.

GAWR (rear): (845 kg), 1,863 lbs.

Vehicle Capacity Weight from Vehicle Placard:

Vehicle Capacity Weight: 400 kg, 881 lbs.

Measured Unloaded Vehicle Weight:

LF	420.5 kg	LR	272.5 kg
RF	421.5 kg	RR	263.0 kg
Front Axle	842.0 kg	Rear Axle	535.5 kg

Total Vehicle 1,377.5 kg

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

LF	455.5 kg	LR	352.0 kg
RF	431.0 kg	RR	319.0 kg
Front Axle	886.5 kg (≤ GAWR)	Rear Axle	671.0 kg (≤ GAWR)

Total Vehicle 1,557.5 kg (not greater than GVWR)

Note: For Scenarios A, B, and C, Malfunction 1, and Gradual Deflations 1, 2 and 3, this Total Vehicle Weight measures the vehicle loaded to Lightly Loaded Vehicle Weight (LLVW). This consisted of the Unloaded Vehicle Weight (UVW) and 180.0 kg of driver, test equipment, and cargo ballast.

RECORDED BY: Anthony Walden DATE: April 13, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 3 of 61)

NORMAL DEFLATION TEST, SCENARIO A – Left Front Tire Deflation at LLVW

TEST DATE: April 13, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Note: See Data Sheet 3 (Sheet 2 of 61) 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: 13.4°C Vehicle cool down period: 240 minutes				
Inflation Pressure	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	15.2°C	13.6°C	15.4°C	15.6°C
Surface Temp	17.4°C	14.4°C	15.4°C	17.2°C

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	18:02:49 UTC	End:	18:30:25 UTC
Trip Odometer Reading:	Start:	67.8 mi	End:	88.3 mi
Ambient Temperature:	Start:	13.4°C	End:	14.4°C
Roadway Temperature:	Start:	27.6°C	End:	30.4°C
Weather Conditions:		Cool & clear		

Driving in first direction:

Starting point: GAFB South Gate Direction: see chart, page 97

11:42 minutes (cumulative stopwatch time) 10.7 mi distance

Driving in opposite direction:

Starting point: US Hwy 87 crossover overpass Direction: see chart, page 97

8:59 minutes (cumulative stopwatch time) 9.8 mi distance

Max speed: 95.83 km/h

Total Cumulative Driving Time: 20:45 minutes (VBOX processed data)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 4 of 61)

NORMAL DEFLATION TEST, SCENARIO A – Left Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	251.2 kPa	249.6 kPa	243.3 kPa	247.0 kPa
Tire Sidewall Temp	32.8°C	30.2°C	31.4°C	25.8°C
Surface Temp	32.2°C	32.2°C	25.2°C	24.4°C

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	165.5 kPa			

TELLTALE ILLUMINATION:

Starting point: No Driving Necessary Direction: N/A

Total distance to Illumination: N/A

Time to illumination: N/A seconds (non-cumulative stopwatch time)

Max Speed: N/A km/h

Total Cumulative Driving Time: N/A seconds (VBox processed data)

Does the vehicle identify which tire(s) is (are) under-inflated? (X)YES ( )NO

If yes: ( )Telltale (X)Reconfigurable Display

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

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)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 5 of 61)

NORMAL DEFLATION TEST, SCENARIO A – Left 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: 17.7°C Vehicle cool down period: 64 minutes				
Inflation Pressure	160.1 kPa	237.8 kPa	235.3 kPa	238.4 kPa
Tire Sidewall Temp	22.2°C	19.4°C	18.8°C	22.4°C
Surface Temp	20.2°C	19.6°C	19.4°C	20.0°C

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

TELLTALE EXTINGUISHMENT:

RE-ADJUSTED TIRE INFLATION PRESSURES:

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

Is it necessary to use a set/reset button to extinguish the low tire pressure telltale?
( )YES ( )NO (X)N/A

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

Starting point: San Angelo Test Facility shop

Total distance to extinguishment: 0.1 mi

Time to extinguishment: 0:51 seconds (non-cumulative stopwatch time)

TEST RESULTS:

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

REMARKS: An alternative route was used due to north gate closure by GAFB

RECORDED BY: Anthony Walden DATE: April 13, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 6 of 61)

NORMAL DEFLATION TEST, SCENARIO B
Left Front and Left Rear Tire Deflation at LLVW

TEST DATE: April 14, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Note: See Data Sheet 3 (Sheet 2 of 61) 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: 14.5°C Vehicle cool down period: overnight				
Inflation Pressure	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	14.0°C	14.0°C	14.4°C	14.8°C
Surface Temp	17.4°C	17.0°C	17.2°C	17.4°C

SYSTEM CALIBRATION/LEARNING PHASE:

Time:	Start:	18:02:49 UTC	End:	18:30:25 UTC
Trip Odometer Reading:	Start:	91.2 mi	End:	111.8 mi
Ambient Temperature:	Start:	14.5°C	End:	10.8°C
Roadway Temperature:	Start:	29.8°C	End:	21.4°C
Weather Conditions:		Cloudy & cold		

Driving in first direction:

Starting point: GAFB South Gate Direction: see chart, page 98

11:42 minutes (cumulative stopwatch time) 11.8 mi distance

Driving in opposite direction:

Starting point: US Hwy 87 crossover overpass Direction: see chart, page 98

8:59 minutes (cumulative stopwatch time) 8.8 mi distance

Max speed: 95.83 km/h

Total Cumulative Driving Time: 20:45 minutes (VBOX processed data)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 7 of 61)

NORMAL DEFLATION TEST, SCENARIO B
Left Front and Left Rear Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	251.9 kPa	247.5 kPa	243.7 kPa	246.3 kPa
Tire Sidewall Temp	30.0°C	27.6°C	20.4°C	23.4°C
Surface Temp	24.2°C	23.8°C	21.2°C	22.0°C

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 ( )RR ( )RF				
Inflation Pressure	165.5 kPa	165.5 kPa		

TELLTALE ILLUMINATION:

Starting point: No Driving Necessary Direction: N/A

Total distance to Illumination: N/A

Time to illumination: N/A seconds (non-cumulative stopwatch time)

Max Speed: N/A km/h

Total Cumulative Driving Time: N/A minutes (VBox processed data)

Does the vehicle identify which tire(s) is (are) under-inflated? (X)YES (X)NO

If yes: ( ) Telltale (X) Reconfigurable Display

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

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)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 8 of 61)

NORMAL DEFLATION TEST, SCENARIO B
Left Front and Left Rear Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
After vehicle cool down period: Ambient Temperature: 16.1°C Vehicle cool down period: 76 minutes				
Inflation Pressure	158.0 kPa	158.2 kPa	234.2 kPa	235.5 kPa
Tire Sidewall Temp	20.6°C	18.2°C	17.4°C	20.2°C
Surface Temp	18.8°C	18.2°C	17.4°C	17.8°C

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:	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa

Is it necessary to use the set/reset button to extinguish the low tire pressure telltale?
( )YES ( )NO (X)N/A

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

Starting point: No Driving Necessary

Total distance to extinguishment: N/A

Time to extinguishment: N/A seconds (non-cumulative stopwatch time)

TEST RESULTS:

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

REMARKS: An alternative route was used due to north gate closure by GAFB

RECORDED BY: Anthony Walden DATE: April 14, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 9 of 61)

NORMAL DEFLATION TEST, SCENARIO C
Left Front, Left Rear, Right Rear, and Right Front Tire Deflation at LLVW

TEST DATE: April 21, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Note: See Data Sheet 3 (Sheet 2 of 61) 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: 19.9°C Vehicle cool down period: overnight				
Inflation Pressure	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	20.4°C	20.4°C	20.8°C	20.6°C
Surface Temp	20.8°C	20.8°C	20.8°C	20.8°C

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 15:10:08 UTC End: 15:36:50 UTC

Trip Odometer Reading: Start: 114.1 mi End: 135.7 mi

Ambient Temperature: Start: 19.9°C End: 23.7°C

Roadway Temperature: Start: 29.2°C End: 36.4°C

Weather Conditions: Warm & clear

Driving in first direction:

Starting point: GAFB South Gate Direction: see chart, page 99

11:42 minutes (cumulative stopwatch time) 11.7 mi distance

Driving in opposite direction:

Starting point: US Hwy 87 crossover overpass Direction: see chart, page 99

8:59 minutes (cumulative stopwatch time) 9.9 mi distance

Max speed: 95.95 km/h

Total Cumulative Driving Time: 20:42 minutes (VBOX processed data)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 10 of 61)

NORMAL DEFLATION TEST, 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	256.8 kPa	250.8 kPa	249.6 kPa	253.4 kPa
Tire Sidewall Temp	41.4°C	36.8°C	33.4°C	37.8°C
Surface Temp	32.4°C	32.2°C	28.2°C	28.8°C

SYSTEM DETECTION PHASE:

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

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

TELLTALE ILLUMINATION:

Starting point: No Driving Necessary Direction: N/A

Total distance to Illumination: N/A

Time to illumination: N/A seconds (non-cumulative stopwatch time)

Max Speed: N/A km/h

Total Cumulative Driving Time: N/A minutes (VBox processed data)

Does the vehicle identify which tire(s) is (are) under-inflated? (X)YES ( )NO

If yes: ( ) Telltale (X) Reconfigurable Display

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

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)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 11 of 61)

NORMAL DEFLATION TEST, 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: 27.4°C Vehicle cool down period: 71 minutes				
Inflation Pressure	157.7 kPa	159.2 kPa	160.4 kPa	160.2 kPa
Tire Sidewall Temp	32.8°C	29.8°C	29.6°C	32.2°C
Surface Temp	25.0°C	24.6°C	24.4°C	24.4°C

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:	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa

Is it necessary to use the set/reset button to extinguish the low tire pressure telltale?
( )YES ( )NO (X)N/A

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

Starting point: No Driving Necessary

Total distance to extinguishment: N/A

Time to extinguishment: N/A seconds (non-cumulative stopwatch time)

TEST RESULTS:

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

REMARKS: An alternative route was used due to north gate closure by GAFB

RECORDED BY: Anthony Walden DATE: April 21, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 12 of 61)

MALFUNCTION DETECTION TEST 1 –
TPMS Left Front Sensor Removed at LLVW

TEST DATE: April 21, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Time:	Start:	12:45 pm	End:	1:56 pm
Trip Odometer Reading:	Start:	137.3 mi	End:	159.2 mi
Ambient Temperature:	Start:	29.6°C	End:	31.2°C

Note: See Data Sheet 3 (Sheet 2 of 61) 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: TPMS Left Front Sensor removed

(see Figure 5.16)

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

Combination Malfunction Telltale

Driving in first direction:

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop Direction: See chart, page 102

Total distance to Illumination: 10.5 mi

Time to illumination: 8:09 minutes (total cumulative driving time)

Max Speed: 94.35 km/h

Total Cumulative Driving Time: 8:09 minutes (VBox processed data)

TEST RESULTS:

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

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 13 of 61)

MALFUNCTION DETECTION TEST 1 –
TPMS Left Front Sensor Removed at LLVW

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

Time, it takes before telltale starts flashing 1 seconds

Time telltale remains flashing 60 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:

Starting point: No Driving Necessary

Total distance to extinguishment: N/A

Time to extinguishment: N/A total driving time (non-cumulative stopwatch time)

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

TPMS MALFUNCTION PERFORMANCE TEST RESULTS (PASS/FAIL) **PASS**
TPMS Left Front Sensor removed at LLVW

REMARKS: Extinguishment was immediate, driving was not necessary.

RECORDED BY: Anthony Walden DATE: April 21, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 14 of 61)

GRADUAL DEFLATION TEST 1
Left Front Tire Deflation at LLVW

TEST DATE: April 22, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Time:	Start:	8:22 am	End:	1:21 pm
Ambient Temperature:	Start:	23.4°C	End:	28.1°C
Odometer Reading (mi):	Start:	159.3	End:	244.0
Fuel Level:	Start:	Full	End:	Used 1/8 of a tank

Weather Condition: Warm & partly cloudy

Note: See Data Sheet 3 (Sheet 2 of 61) for Test Weight

Determining FMVSS No. 138 Gradual Deflation Telltale Minimum Warning Activation Pressure for Tires Installed on Vehicle		
Part	**Front Axle**	**Rear Axle**
Recommended Inflation Pressure x .67	230 kPa x .67 = 154.1 kPa	230 kPa x .67 = 154.1 kPa

TIRE INFLATION PRESSURES

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Pre-test cold measurements after ambient soak	214.4 kPa	228.3 kPa	230.4 kPa	225.8 kPa

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 15 of 61)

GRADUAL DEFLATION TEST 1
Left Front Tire Deflation at LLVW

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: Vehicle cool down period: overnight				
Re-adjusted Inflation Pressure	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	23.8°C	23.6°C	23.8°C	23.8°C
Surface Temp	23.4°C	23.2°C	23.2°C	23.2°C

SYSTEM CALIBRATION/LEARNING PHASE:

Driving in first direction:

Starting point: GAFB South Gate Direction: see chart, page 103
Cumulative vehicle driving time (10 – 15 minutes) at a vehicle speed of 75+ 25 km/h excluding time periods when brake pedal is applied.

11:42 minutes 11.7 distance (mi)

Driving in opposite direction:

Starting point: US Hwy 87 crossover overpass Direction: see chart, page 103
Cumulative vehicle driving time (5 - 12 minutes) at a vehicle speed of 75+ 25 km/h excluding time periods when brake pedal is applied.

8:59 minutes 8.8 distance (mi)

Total stopwatch cumulative driving time (20 - 22 minutes) 20:41 minutes

Max speed: 96.30 km/h **Total Cumulative Driving Time (VBOX processed data): 20:45 minutes**
(20 - 22 minutes)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	248.1kPa	244.1 kPa	244.2 kPa	246.1 kPa
Tire Sidewall Temp	38.6°C	34.6°C	35.6°C	38.8°C
Surface Temp	29.0°C	27.8°C	27.8°C	28.4°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 16 of 61)

GRADUAL DEFLATION TEST 1
Left Front Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Location of Deflated Tire(s)	**(X) LF**	**( ) LR**	**( ) RR**	**( ) RF**
Original Tire Pressures (kPa)	**230.0 kPa**			

Execution Procedure and Item	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
First 14-kPa Deflation Increment	216.0 kPa			
Driving in first direction:				
Cumulative driving time (10 - 15 minutes) 11:42 minutes				
Did low inflation pressure telltale illuminate? Yes ___ No X				
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes) 8:59 minutes				
Did low inflation pressure telltale illuminate? Yes ___ No X				
Total cumulative driving time (20 - 22 minutes) 20:41 minutes				
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	222.9 kPa	248.1 kPa	247.9 kPa	249.6 kPa
Temperature	40.4°C	36.8°C	37.2°C	40.4°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 17 of 61)

GRADUAL DEFLATION TEST 1
Left Front Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Second 14-kPa Deflation Increment	202.0 kPa			
Driving in first direction:				
Cumulative driving time (10 - 15 minutes)	11:42 minutes			
Did low inflation pressure telltale illuminate?		Yes ___	No X	
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes)	8:59 minutes			
Did low inflation pressure telltale illuminate?		Yes ___	No X	
Total cumulative driving time (20 - 22 minutes)	20:41 minutes			
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	205.5 kPa	248.6 kPa	247.8 kPa	249.6 kPa
Temperature	41.2°C	37.8°C	37.2°C	40.4°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 18 of 61)

GRADUAL DEFLATION TEST 1
Left Front Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Third 14-kPa Deflation Increment	188.0 kPa			
Driving in first direction:				
Cumulative driving time (10 - 15 minutes)	11:42 minutes			
Did low inflation pressure telltale illuminate?	Yes ____ No X			
Driving in opposite direction				
Cumulative driving time (5 - 12 minutes)	8:59 minutes			
Did low inflation pressure telltale illuminate?	Yes ____ No X			
Total cumulative driving time (20 - 22 minutes)	20:41 minutes			
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	191.8 kPa	248.9 kPa	247.2 kPa	250.9 kPa
Temperature	44.6°C	38.8°C	39.8°C	40.8°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 19 of 61)

GRADUAL DEFLATION TEST 1
Left Front Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Fourth 14-kPa Deflation Increment	174.0 kPa			
Driving in first direction: No Driving Necessary			Direction: N/A	
Cumulative driving time (10 - 15 minutes)	0:00 seconds			
Did low inflation pressure telltale illuminate?		Yes ____	No ____	
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes)	0:00 minutes			
Did low inflation pressure telltale illuminate?		Yes ____	No ____	
Total cumulative driving time (20 - 22 minutes)	0:00 seconds			

Tire Pressures and Temperatures	LF Tire	LR Tire	RR Tire	RF Tire
Inflation Pressure	174.0 kPa	248.9 kPa	247.2 kPa	250.9 kPa
Temperature	44.6°C	38.8°C	39.8°C	40.8°C

Max speed: N/A km/h

Total Cumulative Driving Time (VBOX processed data): N/A seconds
(20 - 22 minutes)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 20 of 61)

GRADUAL DEFLATION TEST 1
Left Front Tire Deflation at LLVW

TELLTALE ILLUMINATION:

Execution Procedure Paragraph and Item
Did the low inflation pressure warning telltale illuminate before the inflation pressures in the deflated tire(s) reached the low inflation pressure(s) threshold calculated? **__X__ YES (pass) _____ NO**

Does the vehicle identify which tire(s) is (are) under-inflated? (X)YES ( )NO

If yes: ( ) Telltale (X) Reconfigurable Display

Tire Locations Verified: (X)LF ( )LR ( )RR ( )RF

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

After ignition locking system deactivation the and vehicle engine re-start, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position (i.e. Key-on-Engine-on)?

(X)YES ( )NO (fail)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure Paragraph and Item	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
After vehicle cool down period. Vehicle cool down period: 81 minutes				
Inflation Pressure	161.7 kPa	234.3 kPa	234.2 kPa	236.8 kPa
Tire Sidewall Temp	31.2°C	29.0°C	29.8°C	32.2°C
Surface Temp	26.2°C	26.4°C	26.0°C	26.0°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 21 of 61)

GRADUAL DEFLATION TEST 1
Left Front Tire Deflation at LLVW

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

TELLTALE EXTINGUISHMENT:

RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure Paragraph and Item	LF Tire	LR Tire	RR Tire	RF Tire
After cool down period; Re-adjusted Inflation Pressure kPa	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa

If vehicle is equipped with a manual reset control, does activation of this control extinguish the telltale?

( )YES ( )NO (X)N/A

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

Starting point: No Driving Necessary

Total distance to extinguishment: N/A

Time to extinguishment: N/A minutes (non-cumulative stopwatch time)

TPMS PERFORMANCE TEST RESULTS (PASS/FAIL) **PASS**

REMARKS: An alternative route was used due to north gate closure by GAFB

RECORDED BY: Anthony Walden DATE: April 22, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 22 of 61)

GRADUAL DEFLATION TEST 2
Left Rear and Right Front Tire Deflation at LLVW

TEST DATE: April 23, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Time:	Start:	8:25 am	End:	1:30 pm
Ambient Temperature:	Start:	16.4°C	End:	24.9°C
Odometer Reading (mi):	Start:	244.3	End:	329.0
Fuel Level:	Start:	Full	End:	Used 1/8 of a tank
Weather Condition		Cool & clear		

Note: See Data Sheet 3 (Sheet 2 of 61) for Test Weight

Determining FMVSS No. 138 Gradual Deflation Telltale Minimum Warning Activation Pressure for Tires Installed on Vehicle		
Part	**Front Axle**	**Rear Axle**
Recommended Inflation Pressure x .67	230 kPa x .67 = 154.1 kPa	230 kPa x .67 = 154.1 kPa

TIRE INFLATION PRESSURES

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Pre-test cold measurements after ambient soak	219.9 kPa	220.3 kPa	220.2 kPa	222.4 kPa

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 23 of 61)

GRADUAL DEFLATION TEST 2
Left Rear and Right Front Tire Deflation at LLVW

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: Vehicle cool down period: overnight				
Re-adjusted Inflation Pressure	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	17.4°C	16.6°C	17.0°C	18.2°C
Surface Temp	20.4°C	20.2°C	20.4°C	20.8°C

SYSTEM CALIBRATION/LEARNING PHASE:

Driving in first direction:

Starting point: GAFB South Gate Direction: see chart, page 104
Cumulative vehicle driving time (10 – 15 minutes) at a vehicle speed of 75+ 25 km/h excluding time periods when brake pedal is applied.

11:42 minutes 11.8 distance (mi)

Driving in opposite direction:

Starting point: US Hwy 87 crossover overpass Direction: see chart, page 104
Cumulative vehicle driving time (5 - 12 minutes) at a vehicle speed of 75+ 25 km/h excluding time periods when brake pedal is applied.

8.59 minutes 8.8 distance (mi)

Total stopwatch cumulative driving time (20 - 22 minutes) 20:41 minutes

Max speed: 95.93 km/h

Total Cumulative Driving Time (VBOX processed data): 20:45 minutes
(20 - 22 minutes)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	251.8 kPa	248.2 kPa	247.5 kPa	249.6 kPa
Tire Sidewall Temp	34.0°C	29.8°C	30.4°C	33.4°C
Surface Temp	25.6°C	24.8°C	24.2°C	22.8°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 24 of 61)

GRADUAL DEFLATION TEST 2
Left Rear and Right Front Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Location of Deflated Tire(s)	**( ) LF**	**(X) LR**	**( ) RR**	**(X) RF**
Original Tire Pressures (kPa)		**230.0 kPa**		**230.0 kPa**

Execution Procedure and Item	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
First 14-kPa Deflation Increment		216.0 kPa		216.0 kPa
Driving in first direction:				
Cumulative driving time (10 - 15 minutes) 11:42 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No X				
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes) 8:59 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No X				
Total cumulative driving time (20 - 22 minutes) 20:41 minutes				
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	255.5 kPa	220.1 kPa	251.2 kPa	221.6 kPa
Temperature	37.2°C	32.0°C	33.0°C	36.8°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 25 of 61)

GRADUAL DEFLATION TEST 2
Left Rear and Right Front Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Second 14-kPa Deflation Increment		202.0 kPa		202.0 kPa
Driving in first direction:				
Cumulative driving time (10 - 15 minutes)	11:42 minutes			
Did low inflation pressure telltale illuminate?		Yes ____	No X	
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes)	8:59 minutes			
Did low inflation pressure telltale illuminate?		Yes ____	No X	
Total cumulative driving time (20 - 22 minutes)	20:41 minutes			
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	259.7 kPa	206.7 kPa	254.0 kPa	207.3 kPa
Temperature	42.2°C	36.2°C	34.8°C	40.2°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 26 of 61)

GRADUAL DEFLATION TEST 2
Left Rear and Right Front Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Third 14-kPa Deflation Increment		188.0 kPa		188.0 kPa
Driving in first direction:				
Cumulative driving time (10 - 15 minutes)	11:42 minutes			
Did low inflation pressure telltale illuminate?		Yes ____	No X	
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes)	8:59 minutes			
Did low inflation pressure telltale illuminate?		Yes ____	No X	
Total cumulative driving time (20 - 22 minutes)	20:41 minutes			
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	261.0 kPa	190.4 kPa	255.4 kPa	190.6 kPa
Temperature	44.6°C	40.4°C	36.8°C	41.6°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 27 of 61)

GRADUAL DEFLATION TEST 2
Left Rear and Right Front Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Fourth 14-kPa Deflation Increment		174.0 kPa		174.0 kPa
Driving in first direction: No Driving Necessary				
Non-cumulative driving time (10 - 15 minutes) 0:00 seconds				
Did low inflation pressure telltale illuminate? Yes ____ No ____				
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes) 0:00 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No ____				
Total non-cumulative driving time (20 - 22 minutes) 0:00 seconds				
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	261.0 kPa	174.0 kPa	255.4 kPa	174.0 kPa
Temperature	44.6°C	40.4°C	36.8°C	41.6°C

Max speed: N/A km/h

Total Cumulative Driving Time (VBOX processed data): N/A minutes
(20 - 22 minutes)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 28 of 61)

GRADUAL DEFLATION TEST 2
Left Rear and Right Front Tire Deflation at LLVW

TELLTALE ILLUMINATION:

Execution Procedure Paragraph and Item
Did the low inflation pressure warning telltale illuminate before the inflation pressures in the deflated tire(s) reached the low inflation pressure(s) threshold calculated? **__X__ YES (pass) _____ NO**

Does the vehicle identify which tire(s) is (are) under-inflated? (X)YES ( )NO

If yes: ( ) Telltale (X) Reconfigurable Display

Tire Locations Verified: ( )LF (X)LR ( )RR (X)RF

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

After ignition locking system deactivation the and vehicle engine re-start, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position (i.e. Key-on-Engine-on)?

(X)YES ( )NO (fail)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure Paragraph and Item	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
After vehicle cool down period. Vehicle cool down period: 96 minutes				
Inflation Pressure	242.4 kPa	162.4 kPa	241.3 kPa	162.7 kPa
Tire Sidewall Temp	31.6°C	29.4°C	29.4°C	31.4°C
Surface Temp	25.4°C	25.0°C	25.2°C	25.2°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 29 of 61)

GRADUAL DEFLATION TEST 2
Left Rear and Right Front Tire Deflation at LLVW

After the cool down period of approximately one hour, and vehicle engine restart, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the "On" or "Run" position?

(X)YES ( )NO

TELLTALE EXTINGUISHMENT:

RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure Paragraph and Item	LF Tire	LR Tire	RR Tire	RF Tire
After cool down period; Re-adjusted Inflation Pressure kPa	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa

If vehicle is equipped with a manual reset control, does activation of this control extinguish the telltale?

( )YES ( )NO (X)N/A

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

Starting point: No Driving Necessary

Total distance to extinguishment: N/A

Time to extinguishment: N/A seconds (non-cumulative stopwatch time)

TPMS PERFORMANCE TEST RESULTS (PASS/FAIL) **PASS**

REMARKS: An alternative route was used due to north gate closure by GAFB

RECORDED BY: Anthony Walden DATE: April 23, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 30 of 61)

GRADUAL DEFLATION TEST 3
Left Front, Left Rear and Right Rear Tire Deflation at LLVW

TEST DATE: April 24, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Time:	Start:	8:16 am	End:	1:00 pm
Ambient Temperature:	Start:	21.8°C	End:	29.4°C
Odometer Reading (mi):	Start:	329.0	End:	415.7
Fuel Level:	Start:	Full	End:	Used 1/8 of a tank
Weather Condition		Warm & windy		

Note: See Data Sheet 3 (Sheet 2 of 61) for Test Weight.

Determining FMVSS No. 138 Gradual Deflation Telltale Minimum Warning Activation Pressure for Tires Installed on Vehicle		
Part	**Front Axle**	**Rear Axle**
Recommended Inflation Pressure x .67	230 kPa x .67 = 154.1 kPa	230 kPa x .67 = 154.1 kPa

TIRE INFLATION PRESSURES

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Pre-test cold measurements after ambient soak	231.4 kPa	225.6 kPa	233.0 kPa	223.9 kPa

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 31 of 61)

GRADUAL DEFLATION TEST 3
Left Front, Left Rear and Right Rear Tire Deflation at LLVW

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: Vehicle cool down period: overnight				
Re-adjusted Inflation Pressure	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	21.8°C	21.6°C	21.4°C	22.0°C
Surface Temp	22.8°C	22.6°C	22.6°C	22.8°C

SYSTEM CALIBRATION/LEARNING PHASE

Driving in first direction:

Starting point: GAFB South Gate Direction: see chart, page 105
Cumulative vehicle driving time (10 – 15 minutes) at a vehicle speed of 75+ 25 km/h excluding time periods when brake pedal is applied.

11:42 minutes 11.7 distance (mi)

Driving in opposite direction:

Starting point: US Hwy 87 crossover overpass Direction: see chart, page 105
Cumulative vehicle driving time (5 - 12 minutes) at a vehicle speed of 75+ 25 km/h excluding time periods when brake pedal is applied.

8.59 minutes 8.8 distance (mi)

Total stopwatch cumulative driving time (20 - 22 minutes) 20:41 minutes

Max speed: 95.99 km/h **Total Cumulative Driving Time (VBOX processed data): 20:47 minutes**
(20 - 22 minutes)

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	250.6 kPa	245.5 kPa	247.4 kPa	248.7 kPa
Tire Sidewall Temp	37.4°C	32.6°C	33.4°C	35.6°C
Roadway Temp	27.2°C	27.4°C	26.2°C	25.4°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 32 of 61)

GRADUAL DEFLATION TEST 3
Left Front, Left Rear and Right Rear Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Location of Deflated Tire(s)	**(X) LF**	**(X) LR**	**(X) RR**	**( ) RF**
Original Tire Pressures (kPa)	**230.0 kPa**	**230.0 kPa**	**230.0 kPa**	

Execution Procedure and Item	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
First 14-kPa Deflation Increment	216.0 kPa	216.0 kPa	216.0 kPa	
Driving in first direction:				
Cumulative driving time (10 - 15 minutes) 11:42 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No X				
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes) 8:59 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No X				
Total cumulative driving time (20 - 22 minutes) 20:41 minutes				
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	223.5 kPa	222.5 kPa	222.6 kPa	252.4 kPa
Temperature	40.8°C	36.6°C	37.2°C	38.8°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 33 of 61)

GRADUAL DEFLATION TEST 3
Left Front, Left Rear and Right Rear Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Second 14-kPa Deflation Increment	202.0 kPa	202.0 kPa	202.0 kPa	
Driving in first direction:				
Cumulative driving time (10 - 15 minutes)	11:42 minutes			
Did low inflation pressure telltale illuminate?		Yes ____	No X	
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes)	8:59 minutes			
Did low inflation pressure telltale illuminate?		Yes ____	No X	
Total cumulative driving time (20 - 22 minutes)	20:41 minutes			
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	206.1 kPa	206.1 kPa	206.4 kPa	254.0 kPa
Temperature	44.4°C	39.4°C	39.2°C	40.4°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 34 of 61)

GRADUAL DEFLATION TEST 3
Left Front, Left Rear and Right Rear Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Third 14-kPa Deflation Increment	188.0 kPa	188.0 kPa	188.0 kPa	
Driving in first direction:				
Cumulative driving time (10 - 15 minutes)	11:42 minutes			
Did low inflation pressure telltale illuminate?		Yes ____	No X	
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes)	8:59 minutes			
Did low inflation pressure telltale illuminate?		Yes ____	No X	
Total cumulative driving time (20 - 22 minutes)	20:41 minutes			
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	191.9 kPa	191.7 kPa	192.1 kPa	256.3 kPa
Temperature	44.8°C	41.8°C	41.2°C	43.8°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 35 of 61)

GRADUAL DEFLATION TEST 3
Left Front, Left Rear and Right Rear Tire Deflation at LLVW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Fourth 14-kPa Deflation Increment	174.0 kPa	174.0 kPa	174.0 kPa	
Driving in first direction: No Driving Necessary				
Non-cumulative driving time (10-15 minutes) 0:00 seconds				
Did low inflation pressure telltale illuminate? Yes ____ No ____				
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes) 0:00 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No ____				
Total non-cumulative driving time (20 – 22 minutes) 0:00 seconds				

Tire Pressures and Temperatures	LF Tire	LR Tire	RR Tire	RF Tire
Inflation Pressure	174.0. kPa	174.0 kPa	174.0 kPa	256.3 kPa
Temperature	44.8°C	41.8°C	41.2°C	43.8°C

Max speed: N/A km/h

Total Cumulative Driving Time (VBOX processed data): N/A minutes
(20 - 22 minutes)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 36 of 61)

GRADUAL DEFLATION TEST 3
Left Front, Left Rear and Right Rear Tire Deflation at LLVW

TELLTALE ILLUMINATION:

Execution Procedure Paragraph and Item
Did the low inflation pressure warning telltale illuminate before the inflation pressures in the deflated tire(s) reached the low inflation pressure(s) threshold calculated? **__X__ YES (pass) _____ NO**

Does the vehicle identify which tire(s) is (are) under-inflated? (X) YES ( )NO

If yes: ( ) Telltale (X) Reconfigurable Display

Tire Locations Verified: (X)LF (X)LR (X)RR ( )RF

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

After ignition locking system deactivation the and vehicle engine re-start, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position (i.e. Key-on-Engine-on)?

(X)YES ( )NO (fail)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure Paragraph and Item	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
After vehicle cool down period. Vehicle cool down period: 78 minutes				
Inflation Pressure	162.1 kPa	162.8 kPa	163.5 kPa	241.6 kPa
Tire Sidewall Temp	33.6°C	31.0°C	31.6°C	34.0°C
Surface Temp	26.8°C	26.6°C	26.8°C	27.0°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 37 of 61)

GRADUAL DEFLATION TEST 3
Left Front, Left Rear and Right Rear Tire Deflation at LLVW

After the cool down period of approximately one hour, and vehicle engine restart, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the "On" or "Run" position?

(X)YES ( )NO

TELLTALE EXTINGUISHMENT:

RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure Paragraph and Item	LF Tire	LR Tire	RR Tire	RF Tire
After cool down period; Re-adjusted Inflation Pressure kPa	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa

If vehicle is equipped with a manual reset control, does activation of this control extinguish the telltale? ( )YES ( )NO (X)N/A

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

Starting point: No Driving Necessary

Total distance to extinguishment: N/A

Time to extinguishment: N/A seconds (non-cumulative stopwatch time)

TPMS PERFORMANCE TEST RESULTS (PASS/FAIL) **PASS**

REMARKS: An alternative route was used due to north gate closure by GAFB

RECORDED BY: Anthony Walden DATE: April 24, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 38 of 61)

TEST DATE: April 24, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Time: Start: 2:35 pm End: 3:20 pm

Ambient Temperature: Start: 22.2°C End: 22.4°C

Trip Odometer Reading: Start: 415.7 mi

Fuel Level: Start: Full

Weather Conditions: Indoors

Time vehicle remained with engine off and tires shielded from direct sunlight:
(1-hour minimum): 2.5 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	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	25.2°C	25.6°C	26.0°C	26.8°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 39 of 61)

VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: (1,815) kg, 4,001 lbs.

GAWR (front): (980) kg, 2,161 lbs.

GAWR (rear): (845) kg, 1,863 lbs.

Vehicle Capacity Weight from Vehicle Placard:

Vehicle Capacity Weight: 400 kg, 881 lbs.

Measured Unloaded Vehicle Weight:

LF 418.0 kg LR 273.5 kg

RF 423.5 kg RR 260.5 kg

Front Axle 841.5 kg Rear Axle 534.0 kg

Total Vehicle 1,375.5 kg

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

LF 481.5 kg LR 418.0 kg

RF 481.5 kg RR 394.5 kg

Front Axle 963.0 kg (≤ GAWR) Rear Axle 812.5 kg (≤ GAWR)

Total Vehicle 1,775.5 kg (not greater than GVWR)

Note: For Scenarios D and E and Gradual Deflations 4 and 5. This Total Vehicle Weight measures the vehicle loaded to Unloaded Vehicle Weight (UVW) and Vehicle Capacity Weight (VCW). This consisted of the UVW and 400.0 kg of driver, test equipment, and cargo ballast.

RECORDED BY: Anthony Walden DATE: April 24, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 40 of 61)

NORMAL DEFLATION TEST, SCENARIO D
Left Front and Right Front Tire Deflation at UVW+VCW

TEST DATE: April 6, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Note: See Data Sheet 3 (Sheet 39 of 61) 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: 21.7°C Vehicle cool down period: overnight				
Inflation Pressure	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	21.6°C	21.2°C	21.4°C	21.8°C
Surface Temp	22.2°C	22.2°C	22.2°C	22.4°C

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 14:00:31 UTC End: 14:27:54 UTC

Trip Odometer Reading: Start: 416.8 mi End: 437.4 mi

Ambient Temperature: Start: 21.7°C End: 24.7°C

Roadway Temperature: Start: 23.0°C End: 29.4°C

Weather Conditions: Warm, breezy & partly cloudy

Driving in first direction:

Starting point: GAFB South Gate Direction: see chart, page 100

11:42 minutes (cumulative stopwatch time) 11.8 mi distance

Driving in opposite direction:

Starting point: US Hwy 87 crossover overpass Direction: see chart, page 100

9:03 minutes (cumulative stopwatch time) 8.8 mi distance

Max speed: 96.33 km/h

Total Cumulative Driving Time: 20:45 minutes (VBOX processed data)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 41 of 61)

NORMAL DEFLATION TEST, SCENARIO D
Left Front and Right Front Tire Deflation at UVW+VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Immediately, after vehicle is stopped, engine off: Inflation Pressure	251.3 kPa	247.3 kPa	247.3 kPa	249.2 kPa
Tire Sidewall Temp	39.4°C	35.2°C	34.6°C	36.0°C
Surface Temp	29.2°C	29.2°C	27.8°C	26.4°C

SYSTEM DETECTION PHASE:

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

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

TELLTALE ILLUMINATION:

Starting point: No Driving Necessary Direction: N/A

Total distance to Illumination: N/A

Time to illumination: N/A minutes (non-cumulative stopwatch time)

Max Speed: N/A km/h

Total Cumulative Driving Time: N/A seconds (VBox processed data)

Does the vehicle identify which tire(s) is (are) under-inflated? (X)YES ( )NO

If yes: ( ) Telltale (X) Reconfigurable Display

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

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)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 42 of 61)

NORMAL DEFLATION TEST, SCENARIO D
Left Front 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: 26.0°C Vehicle cool down period: 69 minutes				
Inflation Pressure	158.0 kPa	234.1 kPa	233.7 kPa	160.1 kPa
Tire Sidewall Temp	29.2°C	26.4°C	26.4°C	29.8°C
Surface Temp	24.8°C	24.6°C	24.6°C	24.8°C

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:	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa

Is it necessary to use the set/reset button to extinguish the low tire pressure telltale?
( )YES ( )NO (X)N/A

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

Starting point: No Driving Necessary

Total distance to extinguishment: N/A

Time to extinguishment: N/A seconds (non-cumulative stopwatch time)

TEST RESULTS:

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

REMARKS: An alternative route was used due to north gate closure by GAFB

RECORDED BY: Anthony Walden DATE: April 27, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 43 of 61)

NORMAL DEFLATION TEST, SCENARIO E
Left Rear, Right Rear, and Right Front Tire Deflation at UVW+VCW

TEST DATE: April 27, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Note: See Data Sheet 3 (Sheet 39 of 61) 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: 25.6°C Vehicle cool down period: 75 minutes				
Inflation Pressure	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	29.4°C	26.4°C	26.4°C	29.6°C
Surface Temp	25.0°C	24.6°C	24.6°C	24.8°C

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 16:19:45 UTC End: 16:47:33 UTC

Trip Odometer Reading: Start: 439.2 mi End: 460.8 mi

Ambient Temperature: Start: 25.9°C End: 29.1°C

Roadway Temperature: Start: 37.4°C End: 41.4°C

Weather Conditions: Warm, windy, & partly cloudy

Driving in first direction:

Starting point: GAFB South Gate Direction: see chart, page 101

11:42 minutes (cumulative stopwatch time) 11.7 mi distance

Driving in opposite direction:

Starting point: US Hwy 87 crossover overpass Direction: see chart, page 101

9:03 minutes (cumulative stopwatch time) 8.9 mi distance

Max speed: 95.94 km/h

Total Cumulative Driving Time: 20:43 minutes (VBOX processed data)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 44 of 61)

NORMAL DEFLATION TEST, SCENARIO E
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	250.4 kPa	250.8 kPa	250.5 kPa	247.8 kPa
Tire Sidewall Temp	46.6°C	41.6°C	41.4°C	42.4°C
Surface Temp	40.6°C	40.6°C	35.6°C	36.6°C

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		165.5 kPa	165.5 kPa	165.5 kPa

TELLTALE ILLUMINATION:

Starting point: No Driving Necessary Direction: N/A

Total distance to Illumination: N/A

Time to illumination: N/A seconds (non-cumulative stopwatch time)

Max Speed: N/A km/h

Total Cumulative Driving Time: N/A seconds (VBox processed data)

Does the vehicle identify which tire(s) is (are) under-inflated? (X)YES ( )NO

If yes: ( ) Telltale (X) Reconfigurable Display

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

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)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 45 of 61)

NORMAL DEFLATION TEST, SCENARIO E
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: 29.9°C Vehicle cool down period: 65 minutes				
Inflation Pressure	235.2 kPa	156.3 kPa	156.6 kPa	158.5 kPa
Tire Sidewall Temp	35.2°C	30.6°C	30.4°C	33.6°C
Surface Temp	26.8°C	26.8°C	26.8°C	26.8°C

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:	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa

Is it necessary to use the set/reset button to extinguish the low tire pressure telltale?
( )YES ( )NO (X)N/A

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

Starting point: No Driving Necessary

Total distance to extinguishment: N/A

Time to extinguishment: N/A seconds (non-cumulative stopwatch time)

TEST RESULTS:

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

REMARKS: An alternative route was used due to north gate closure by GAFB

RECORDED BY: Anthony Walden DATE: April 27, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 46 of 61)

GRADUAL DEFLATION TEST 4
Right Rear Tire Deflation at UVW+VCW

TEST DATE: April 28, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Time:	Start:	8:28 am	End:	12:47 pm
Ambient Temperature	Start:	22.5°C	End:	32.8ºC
Odometer Reading (mi):	Start:	462.6	End:	547.8
Fuel Level:	Start:	Full	End:	Used 1/8 of a tank
Weather Condition		Warm, clear, & breezy		

Note: See Data Sheet 3 (Sheet 39 of 61) for Test Weight.

Determining FMVSS No. 138 Gradual Deflation Telltale Minimum Warning Activation Pressure for Tires Installed on Vehicle		
Part	**Front Axle**	**Rear Axle**
Recommended Inflation Pressure x .67	230 kPa x .67 = 154.1 kPa	230 kPa x .67 = 154.1 kPa

TIRE INFLATION PRESSURES AND TIRE/ROADWAY TEMPERATURES

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Pre-test cold measurements after ambient soak	222.4 kPa	225.6 kPa	226.3 kPa	228.9 kPa

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 47 of 61)

GRADUAL DEFLATION TEST 4
Right Rear Tire Deflation at UVW+VCW

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: Vehicle cool down period: overnight				
Re-adjusted Inflation Pressure	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	23.2°C	22.6°C	22.8°C	23.2°C
Surface Temp	23.6°C	23.2°C	23.2°C	23.4°C

SYSTEM CALIBRATION/LEARNING PHASE

Driving in first direction:

Starting point: GAFB South Gate Direction: see chart, page 106
Cumulative vehicle driving time (10 – 15 minutes) at a vehicle speed of 75± 25 km/h excluding time periods when brake pedal is applied.

11:42 minutes 11.7 distance (mi)

Driving in opposite direction:

Starting point: US Hwy 87 crossover overpass Direction: see chart, page 106
Cumulative vehicle driving time (5 - 12 minutes) at a vehicle speed of 75± 25 km/h excluding time periods when brake pedal is applied.

8:59 minutes 8.7 distance (mi)

Total stopwatch cumulative driving time (20 - 22 minutes) 20:41 minutes

Max speed: 96.33 km/h

Total Cumulative Driving Time (VBOX processed data): 20:43 minutes
(20 - 22 minutes)

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	252.4 kPa	250.1 kPa	248.2 kPa	249.5 kPa
Tire Sidewall Temp	43.6°C	41.2°C	33.4°C	34.8°C
Surface Temp	27.2°C	27.6°C	25.8°C	26.0°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 48 of 61)

GRADUAL DEFLATION TEST 4
Right Rear Tire Deflation at UVW+VCW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Location of Deflated Tire(s)	**( ) LF**	**( ) LR**	**(X) RR**	**( ) RF**
Original Tire Pressures (kPa)			**230.0 kPa**	

Execution Procedure and Item	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
First 14-kPa Deflation Increment			216.0 kPa	
Driving in first direction:				
Cumulative driving time (10 - 15 minutes) 11:42 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No X				
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes) 8:59 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No X				
Total cumulative driving time (20 - 22 minutes) 20.41 minutes				
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	255.7 kPa	252.4 kPa	221.8 kPa	249.3 kPa
Temperature	57.0°C	51.6°C	34.6°C	35.6°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 49 of 61)

GRADUAL DEFLATION TEST 4
Right Rear Tire Deflation at UVW+VCW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Second 14-kPa Deflation Increment			202.0 kPa	
Driving in first direction:				
Cumulative driving time (10 - 15 minutes) 11:42 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No X				
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes) 8:59 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No X				
Total cumulative driving time (20 - 22 minutes) 20:41 minutes				
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	257.7 kPa	254.8 kPa	207.8 kPa	253.4 kPa
Temperature	49.0°C	46.4°C	39.6°C	40.6°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 52 of 61)

GRADUAL DEFLATION TEST 4
Right Rear Tire Deflation at UVW+VCW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Third 14-kPa Deflation Increment			188.0 kPa	
Driving in first direction:				
Cumulative driving time (10 - 15 minutes)	11:42 minutes			
Did low inflation pressure telltale illuminate?	Yes ____ No X			
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes)	8:59 minutes			
Did low inflation pressure telltale illuminate?	Yes ____ No X			
Total cumulative driving time (20 - 22 minutes)	20:41 minutes			
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	260.6 kPa	257.6 kPa	193.3 kPa	256.2 kPa
Temperature	50.8°C	48.8°C	42.2°C	42.6°C

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 51 of 61)

GRADUAL DEFLATION TEST 4
Left Rear and Right Front Tire Deflation at UVW+VCW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Fourth 14-kPa Deflation Increment			174.0 kPa	
Driving in first direction: No Driving Necessary				
Non-cumulative driving time (10-15 minutes) 0:00 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No ____				
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes) 0:00 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No ____				
Total non-cumulative driving time (20 – 22 minutes) 0:00 minutes				
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	260.6 kPa	257.6 kPa	174.0 kPa	256.2 kPa
Temperature	50.8°C	48.8°C	42.2°C	42.6°C

Max speed: N/A km/h

Total Cumulative Driving Time (VBOX processed data): N/A minutes
(20 - 22 minutes)

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 52 of 61)

GRADUAL DEFLATION TEST 4
Right Rear Tire Deflation at UVW+VCW

TELLTALE ILLUMINATION:

Execution Procedure Paragraph and Item
Did the low inflation pressure warning telltale illuminate before the inflation pressures in the deflated tire(s) reached the low inflation pressure(s) threshold calculated? **__X__ YES (pass) _____ NO**

Does the vehicle identify which tire(s) is (are) under-inflated? (X)YES ( )NO

If yes: ( ) Telltale (X) Reconfigurable Display

Tire Locations Verified: ( )LF ( )LR (X)RR ( )RF

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

After ignition locking system deactivation the and vehicle engine re-start, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position (i.e. Key-on-Engine-on)?

(X)YES ( )NO (fail)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure Paragraph and Item	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
After vehicle cool down period. Vehicle cool down period: 95 minutes				
Inflation Pressure	241.6 kPa	239.0 kPa	162.8 kPa	240.8 kPa
Tire Sidewall Temp	35.6°C	32.4°C	32.4°C	35.4°C
Surface Temp	28.0°C	28.2°C	28.0°C	27.8°C

.

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 53 of 61)

GRADUAL DEFLATION TEST 4
Right Rear Tire Deflation at UVW+VCW

After the cool down period of approximately one hour, and vehicle engine restart, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the "On" or "Run" position?

(X)YES ( )NO

TELLTALE EXTINGUISHMENT:

RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure Paragraph and Item	LF Tire	LR Tire	RR Tire	RF Tire
After cool down period; Re-adjusted Inflation Pressure kPa	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa

If vehicle is equipped with a manual reset control, does activation of this control extinguish the telltale?

( )YES ( )NO (X)N/A

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

Starting point: No Driving Necessary

Total distance to extinguishment: N/A

Time to extinguishment: N/A seconds (non-cumulative stopwatch time)

TPMS PERFORMANCE TEST RESULTS (PASS/FAIL) **PASS**

Right rear tire was deflated at UVW+VCW

REMARKS: An alternative route was used due to north gate closure by GAFB

RECORDED BY: Anthony Walden DATE: April 28, 2020

APPROVED BY: Jayton Lindley

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 54 of 61)

GRADUAL DEFLATION TEST 5
Right Rear and Right Front Tire Deflation at UVW+VCW

TEST DATE: April 29, 2020 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C20205203

Time:	Start:	8:05 am	End:	12:26 pm
Ambient Temperature	Start:	20.9°C	End:	23.6°C
Odometer Reading (mi):	Start:	548.2	End:	632.9
Fuel Level:	Start:	Full	End:	Use 1/8th of a tank
Weather Condition:		Warm & windy		

Note: See Data Sheet 3 (Sheet 39 of 61) for Test Weight

Determining FMVSS No. 138 Gradual Deflation Telltale Minimum Warning Activation Pressure for Tires Installed on Vehicle		
Part	**Front Axle**	**Rear Axle**
Recommended Inflation Pressure x .67	230 kPa x .67 = 154.1 kPa	230 kPa x .67 = 154.1 kPa

TIRE INFLATION PRESSURES AND TIRE/ROADWAY TEMPERATURES

Execution Procedure	LF Tire	LR Tire	RR Tire	RF Tire
Pre-test cold measurements after ambient soak	228.5 kPa	228.0 kPa	231.5 kPa	228.8 kPa

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 55 of 61)

GRADUAL DEFLATION TEST 5
Right Rear and Right Front Tire Deflation at UVW+VCW

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: Vehicle cool down period: overnight				
Re-adjusted Inflation Pressure	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa
Tire Sidewall Temp	23.2°C	22.2°C	21.8°C	23.0°C
Surface Temp	24.2°C	23.8°C	23.6°C	23.8°C

SYSTEM CALIBRATION/LEARNING PHASE

Driving in first direction:

Starting point: GAFB South Gate Direction: see chart, page 107
Cumulative vehicle driving time (10 – 15 minutes) at a vehicle speed of 75± 25 km/h excluding time periods when brake pedal is applied.

11:42 minutes 11.7 distance (mi)

Driving in opposite direction:

Starting point: US Hwy 87 crossover overpass Direction: see chart, page 107
Cumulative vehicle driving time (5 - 12 minutes) at a vehicle speed of 75± 25 km/h excluding time periods when brake pedal is applied.

8:59 minutes 8.0 distance (mi)

Total stopwatch cumulative driving time (20 - 22 minutes) 20:41 minutes

Max speed: 96.09 km/h

Total Cumulative Driving Time (VBOX processed data): 20:42 minutes
(20 - 22 minutes)

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	246.7 kPa	245.1 kPa	242.6 kPa	243.4 kPa
Tire Sidewall Temp	37.2°C	36.8°C	29.2°C	32.0°C
Surface Temp	24.2°C	24.2°C	23.6°C	24.0°C

GRADUAL DEFLATION TEST 5
Right Rear and Right Front Tire Deflation at UVW+VCW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Location of Deflated Tire(s)	**( ) LF**	**( ) LR**	**(X) RR**	**(X) RF**
Original Tire Pressures (kPa)			**230.0 kPa**	**230.0 kPa**

Execution Procedure and Item	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
First 14-kPa Deflation Increment			216.0 kPa	216.0 kPa
Driving in first direction:				
Cumulative driving time (10 - 15 minutes) 11:42 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No X				
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes) 8:59 minutes				
Did low inflation pressure telltale illuminate? Yes ____ No X				
Total cumulative driving time (20 - 22 minutes) 20:41 minutes				
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	251.3 kPa	248.5 kPa	222.9 kPa	222.5 kPa
Temperature	39.4°C	38.4°C	32.0°C	36.4°C

GRADUAL DEFLATION TEST 5
Right Rear and Right Front Tire Deflation at UVW+VCW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Second 14-kPa Deflation Increment			202.0 kPa	202.0 kPa
Driving in first direction:				
Cumulative driving time (10 - 15 minutes)	11:42 minutes			
Did low inflation pressure telltale illuminate?	Yes ____ No X			
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes)	8:59 minutes			
Did low inflation pressure telltale illuminate?	Yes ____ No X			
Total cumulative driving time (20 - 22 minutes)	20:41 minutes			
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	253.2 kPa	250.2 kPa	206.6 kPa	206.3 kPa
Temperature	42.6°C	40.2°C	34.8°C	38.6°C

GRADUAL DEFLATION TEST 5
Right Rear and Right Front Tire Deflation at UVW+VCW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Third 14-kPa Deflation Increment			188.0 kPa	188.0 kPa
Driving in first direction:				
Cumulative driving time (10 - 15 minutes)	11:42 minutes			
Did low inflation pressure telltale illuminate?	Yes ____ No X			
Driving in opposite direction:				
Cumulative driving time (5 - 12 minutes)	8:59 minutes			
Did low inflation pressure telltale illuminate?	Yes ____ No X			
Total cumulative driving time (20 - 22 minutes)	20:41 minutes			
Tire Pressures and Temperatures	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
Inflation Pressure	253.1 kPa	250.5 kPa	191.1 kPa	191.6 kPa
Temperature	40.8°C	40.4°C	36.6°C	40.2°C

GRADUAL DEFLATION TEST 5
Right Rear and Right Front Tire Deflation at UVW+VCW

TIRE PRESSURE & TEMPERATURE DURING LOW INFLATION PRESSURE TEST

Execution Procedure and Item	LF Tire	LR Tire	RR Tire	RF Tire
Fourth 14-kPa Deflation Increment			174.0 kPa	174.0 kPa
Driving in first direction: No Driving Necessary Non-cumulative driving time (10-15 minutes) 0:00 seconds Did low inflation pressure telltale illuminate? Yes ____ No ____				
Driving in opposite direction: Cumulative driving time (5 - 12 minutes) 0:00 minutes Did low inflation pressure telltale illuminate? Yes ____ No ____				
Total non-cumulative driving time (20 – 22 minutes) 0:00 seconds				

Tire Pressures and Temperatures	LF Tire	LR Tire	RR Tire	RF Tire
Inflation Pressure	253.1 kPa	250.5 kPa	174.0 kPa	174.0 kPa
Temperature	40.8°C	40.4°C	36.6°C	40.2°C

Max speed: N/A km/h

Total Cumulative Driving Time (VBOX processed data): N/A minutes
(20 - 22 minutes)

GRADUAL DEFLATION TEST 5
Right Rear and Right Front Tire Deflation at UVW+VCW

TELLTALE ILLUMINATION:

Execution Procedure Paragraph and Item
Did the low inflation pressure warning telltale illuminate before the inflation pressures in the deflated tire(s) reached the low inflation pressure(s) threshold calculated? **__X__ YES (pass) _____ NO**

Does the vehicle identify which tire(s) is (are) under-inflated? (X)YES ( )NO

If yes: ( ) Telltale (X) Reconfigurable Display

Tire Locations Verified: ( )LF ( )LR (X)RR (X)RF

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

After ignition locking system deactivation the and vehicle engine re-start, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position (i.e. Key-on-Engine-on)?

(X)YES ( )NO (fail)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

Execution Procedure Paragraph and Item	**LF Tire**	**LR Tire**	**RR Tire**	**RF Tire**
After vehicle cool down period. Vehicle cool down period: 81 minutes				
Inflation Pressure	236.5 kPa	234.2 kPa	164.0 kPa	164.7 kPa
Tire Sidewall Temp	31.2°C	28.4°C	27.8°C	31.8°C
Surface Temp	26.6°C	26.2°C	26.2°C	26.6°C

.

TPMS OPERATIONAL PERFORMANCE
DATA SHEET 3 (Sheet 61 of 61)

GRADUAL DEFLATION TEST 5
Right Rear and Right Front Tire Deflation at UVW+VCW

After the cool down period of approximately one hour, and vehicle engine restart, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the "On" or "Run" position?

(X)YES ( )NO

TELLTALE EXTINGUISHMENT:

RE-ADJUSTED TIRE INFLATION PRESSURES:

Execution Procedure Paragraph and Item	LF Tire	LR Tire	RR Tire	RF Tire
After cool down period; Re-adjusted Inflation Pressure kPa	230.0 kPa	230.0 kPa	230.0 kPa	230.0 kPa

If vehicle is equipped with a manual reset control, does activation of this control extinguish the telltale?

( )YES ( )NO (X)N/A

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

Starting point: No Driving Necessary

Total distance to extinguishment: N/A

Time to extinguishment: N/A seconds (non-cumulative stopwatch time)

TPMS PERFORMANCE TEST RESULTS (PASS/FAIL) **PASS**

Right rear and right front tires were deflated at UVW+VCW

REMARKS: An alternative route was used due to north gate closure by GAFB

RECORDED BY: Anthony Walden DATE: April 29, 2020

APPROVED BY: Jayton Lindley

TPMS WRITTEN INSTRUCTIONS
DATA SHEET 4 (Sheet 1 of 3)

TEST **VEHICLE**
DATE: April 29, 2020 **LAB:** San Angelo Test Facility **NHTSA NO:** C20205203

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."

TPMS WRITTEN INSTRUCTIONS
DATA SHEET 4 (Sheet 2 of 3)

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**

REMARKS: NONE

TPMS WRITTEN INSTRUCTIONS
DATA SHEET 4 (Sheet 3 of 3)

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

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

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

REMARKS: None

RECORDED BY: Anthony Walden DATE: April 29, 2020

APPROVED BY: Jayton Lindley

SECTION 4

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO	CAL. DATE	NEXT CAL. DATE
AIR PRESSURE GAUGE	ASHCROFT GENERAL PURPOSE DIGITAL GAUGE	DG2551L2NAM02L 100# - XCA, #3093017001	12/20/2019	12/20/2020
FLOOR SCALES (VEHICLE & BALLAST)	INTERCOMP SW DELUXE SCALES	SERIAL #27032382-23746	11/04/2019	11/04/2020
DIGITAL THERMOMETER	FLUKE 50D	SERIAL #80840101	06/18/2019	06/18/2020
LASER TEMPERATURE GAUGE (TIRES AND GROUND)	RAYTEK MINITEMP MT6UVB	SERIAL # 12460128	12/20/2019	12/20/2020
VBOX RECORDING DEVICE	RACELOGIC VBOX 3iSL	SERIAL # 24491	11/07/2019	11/06/2020
STOPWATCH	ROBIC SC-505W STOPWATCH	N/A	N/A	N/A

SECTION 5
PHOTOGRAPHS

2020 NISSAN SENTRA SV
NHTSA NO. C20205203
FMVSS NO. 138

FIGURE 5.1
THREE-QUARTER FRONT VIEW FROM LEFT SIDE OF VEHICLE

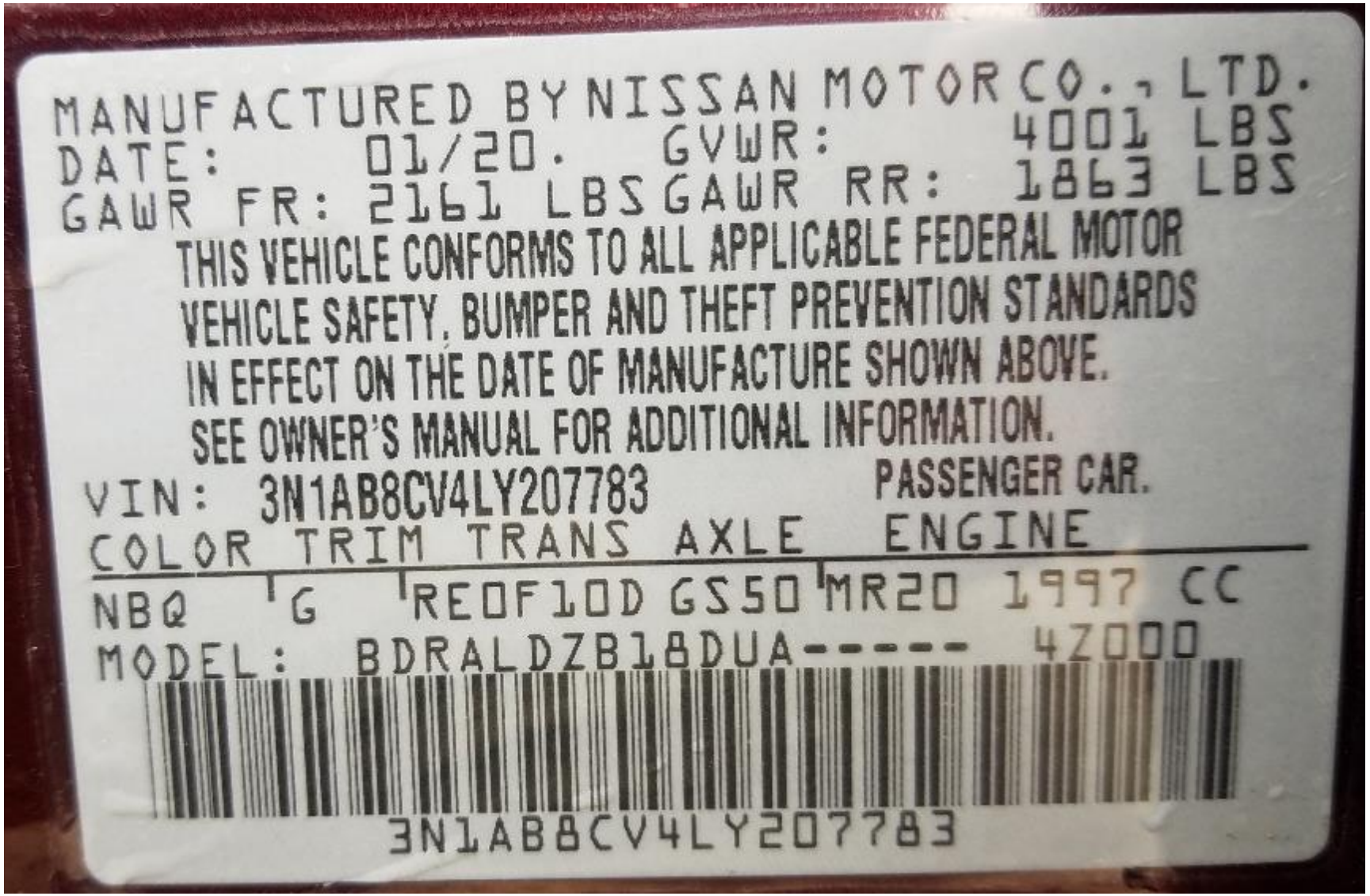


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FIGURE 5.2
VEHICLE CERTIFICATION LABEL

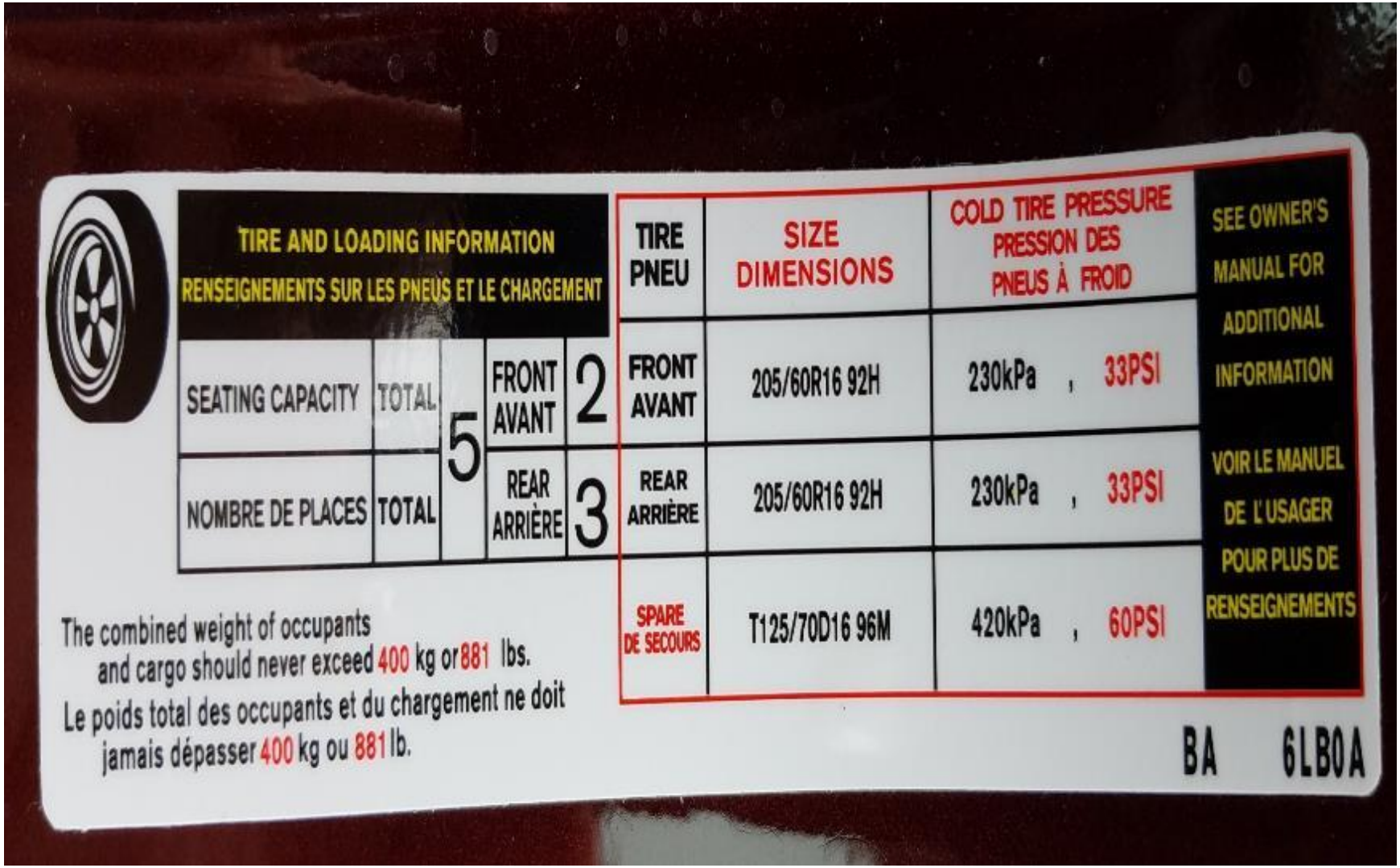

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FIGURE 5.3
VEHICLE PLACARD

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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

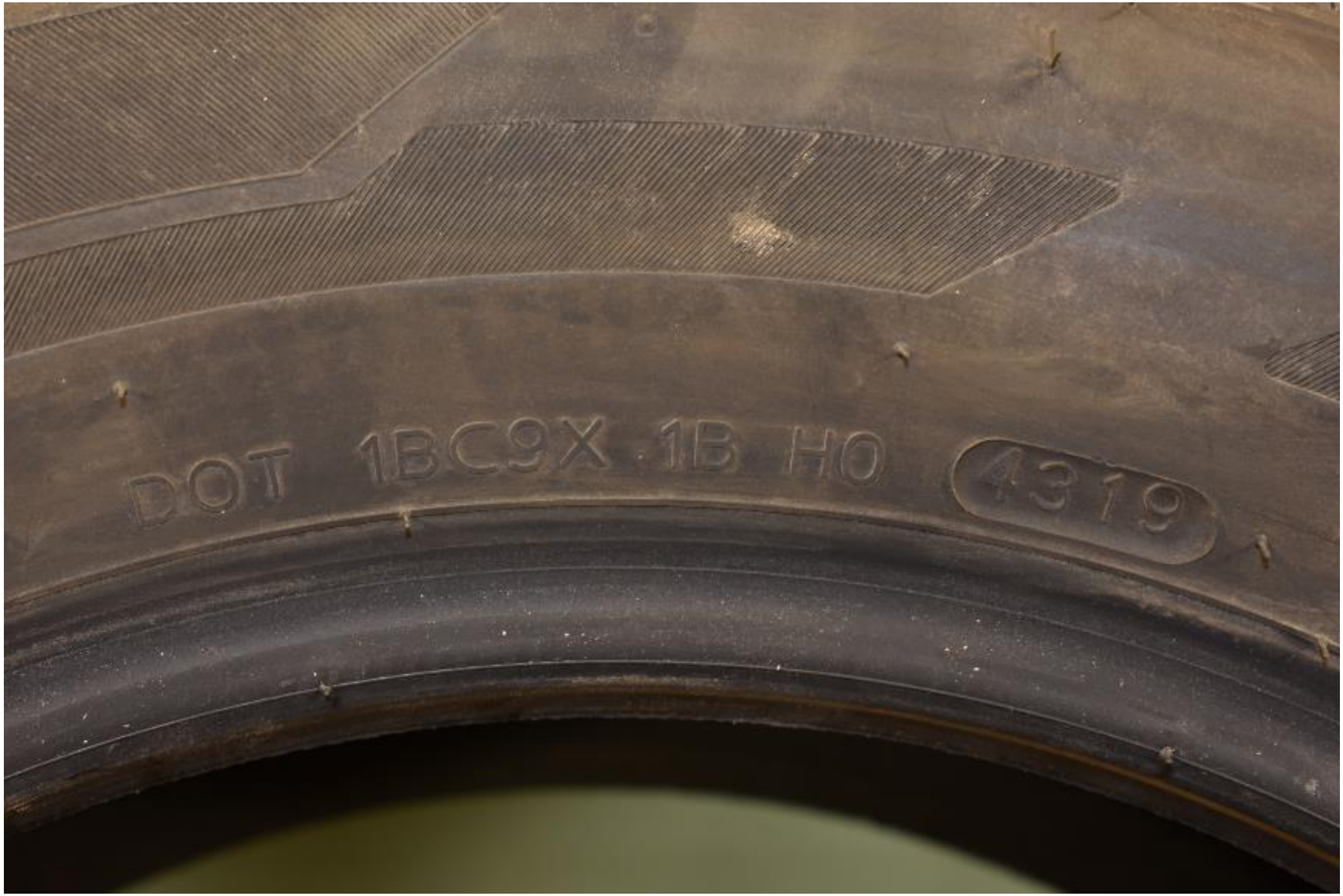

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FIGURE 5.7
TIRE SHOWING DOT NUMBER

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

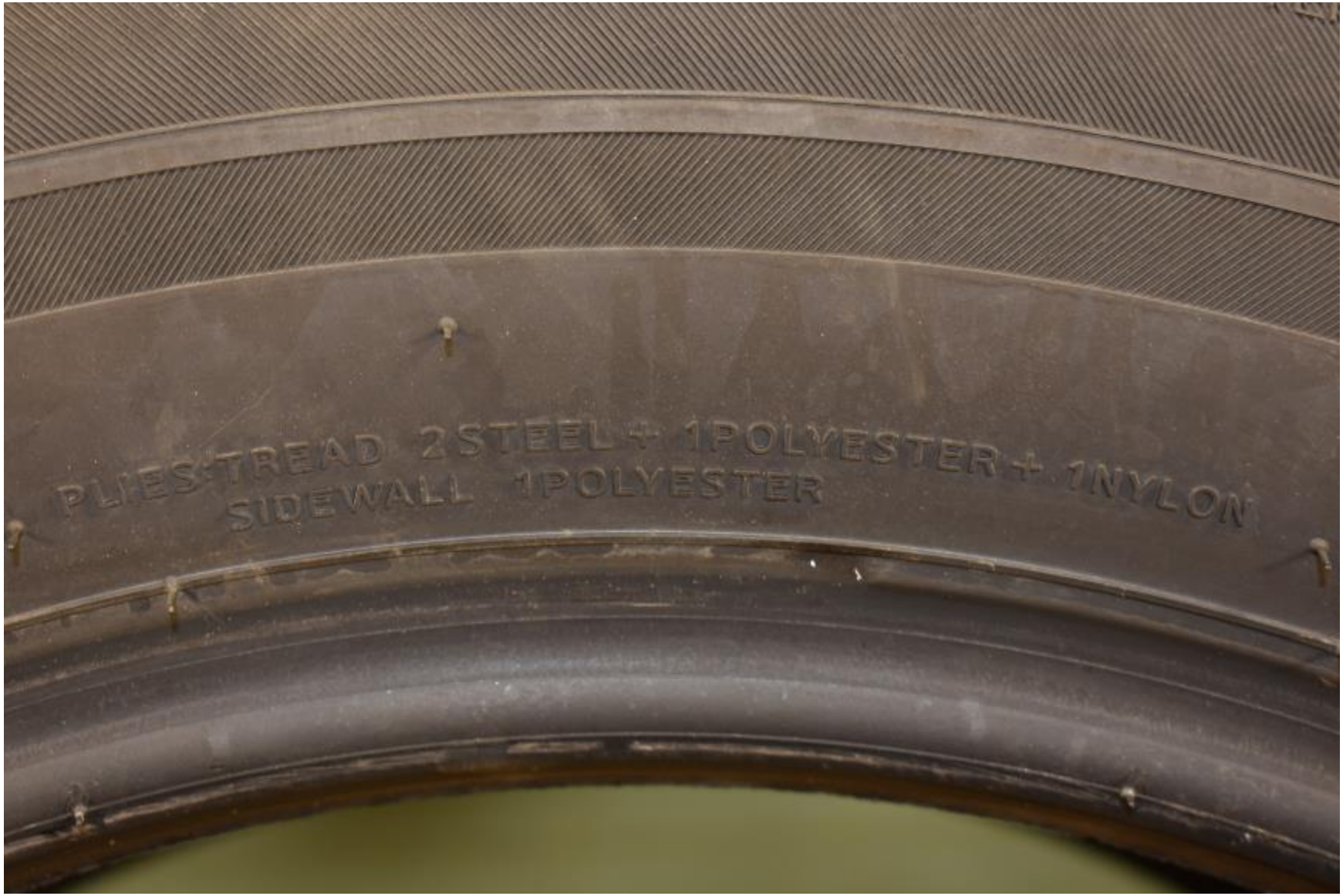

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FIGURE 5.9
TIRE SHOWING SIDEWALL / TREAD CONSTRUCTION

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FIGURE 5.10
TEST INSTRUMENTATION INSTALLED IN VEHICLE

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FIGURE 5.11
CARGO AREA BALLAST FOR LLVW LOAD

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FIGURE 5.12
FRONT PASSENGER SEAT BALLAST FOR UVW+VCW
GAWR LOAD

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FIGURE 5.13
REAR SEAT BALLAST FOR UVW+VCW GAWR LOAD

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FIGURE 5.14
VEHICLE CARGO AREA BALLAST FOR UVW+VCW GAWR LOAD

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FIGURE 5.15
VEHICLE ON WEIGHT SCALES

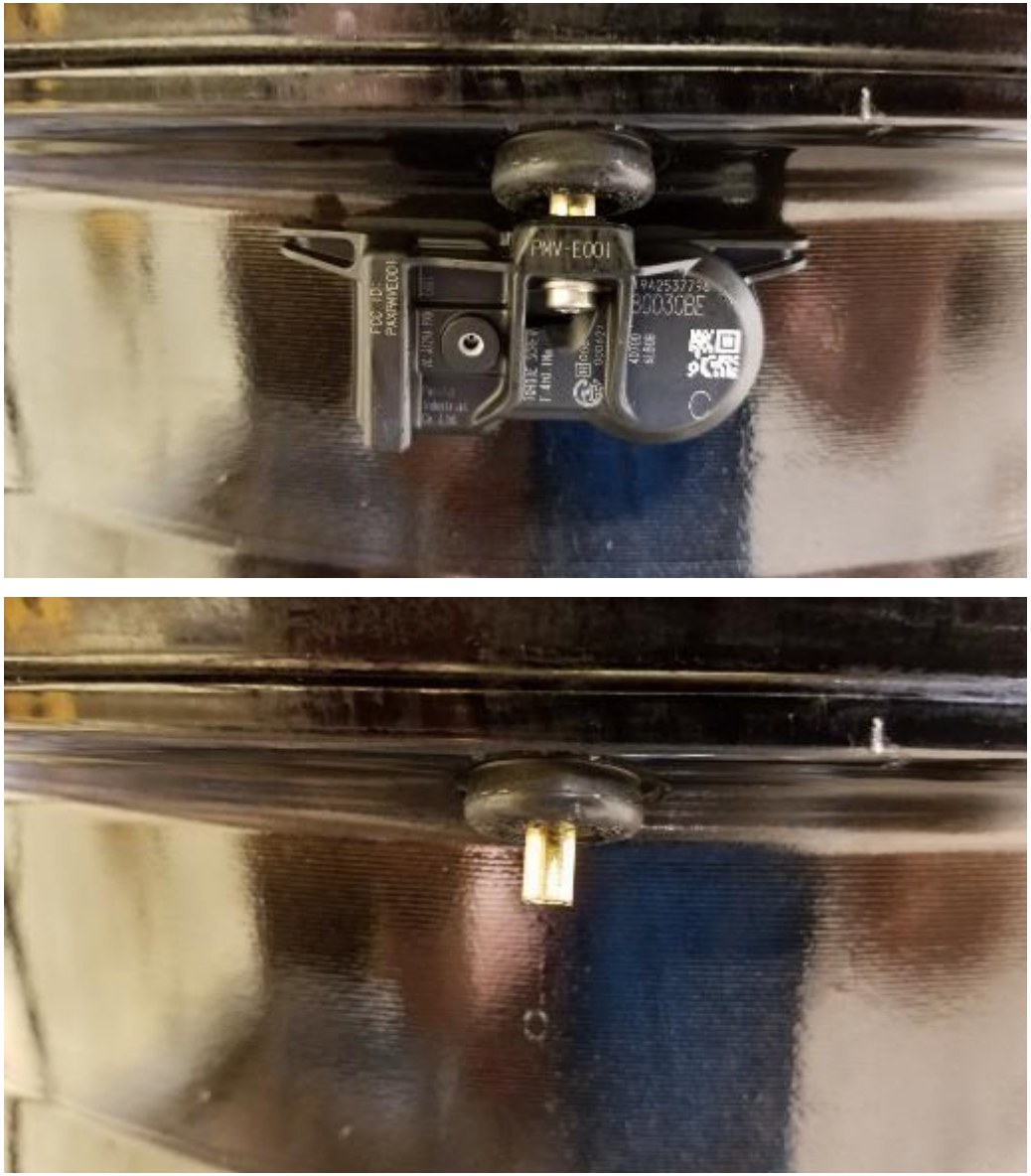

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FIGURE 5.16
MALFUNCTION DETECTION TEST 1
TPMS LEFT FRONT SENSOR REMOVED AT LLVW

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FIGURE 5.17
VEHICLE INSTRUMENT PANEL LAMP CHECK

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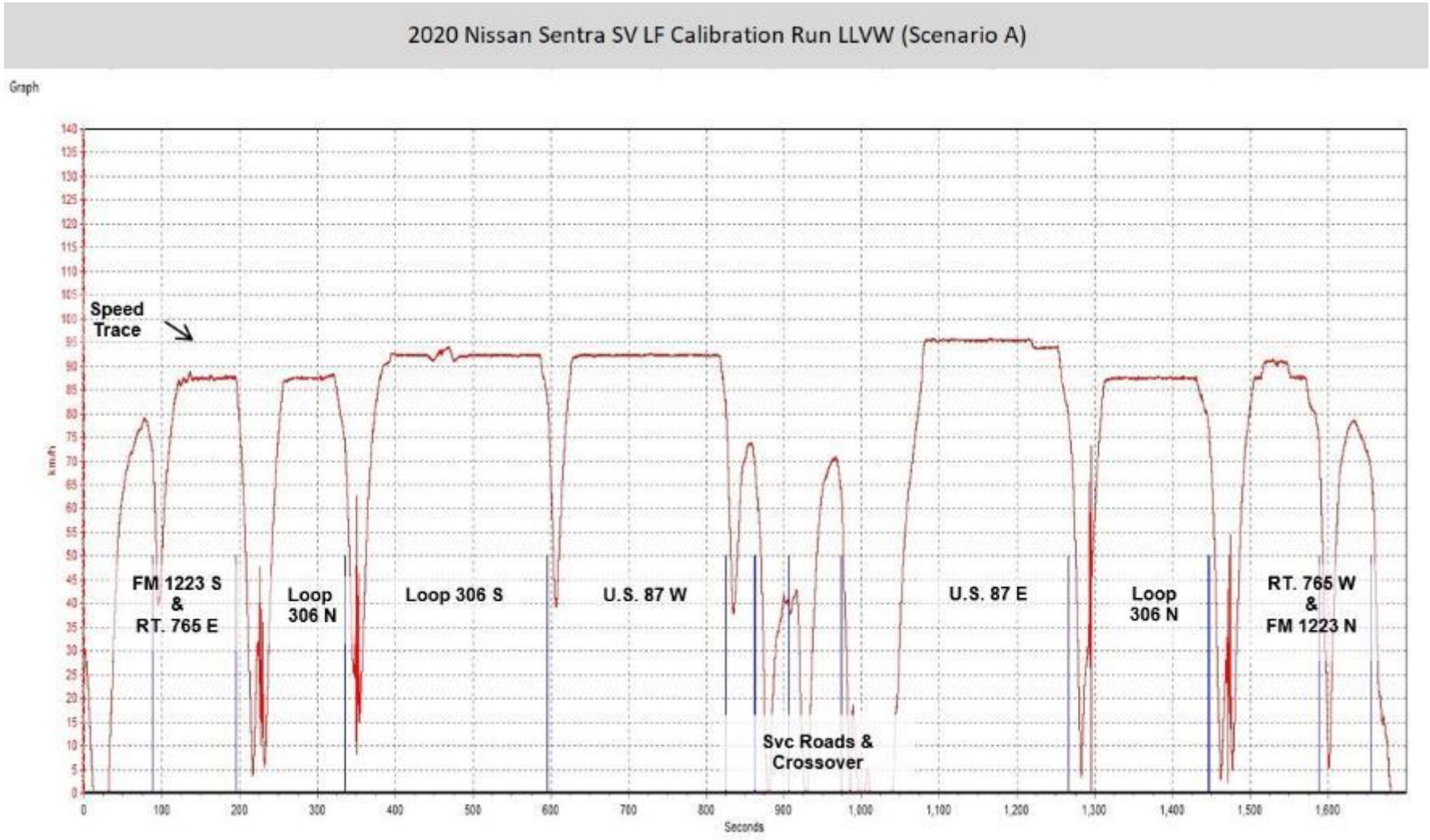
FIGURE 5.18
TPMS LOW TIRE PRESSURE TELLTALE ILLUMINATION

SECTION 6
TEST PLOTS

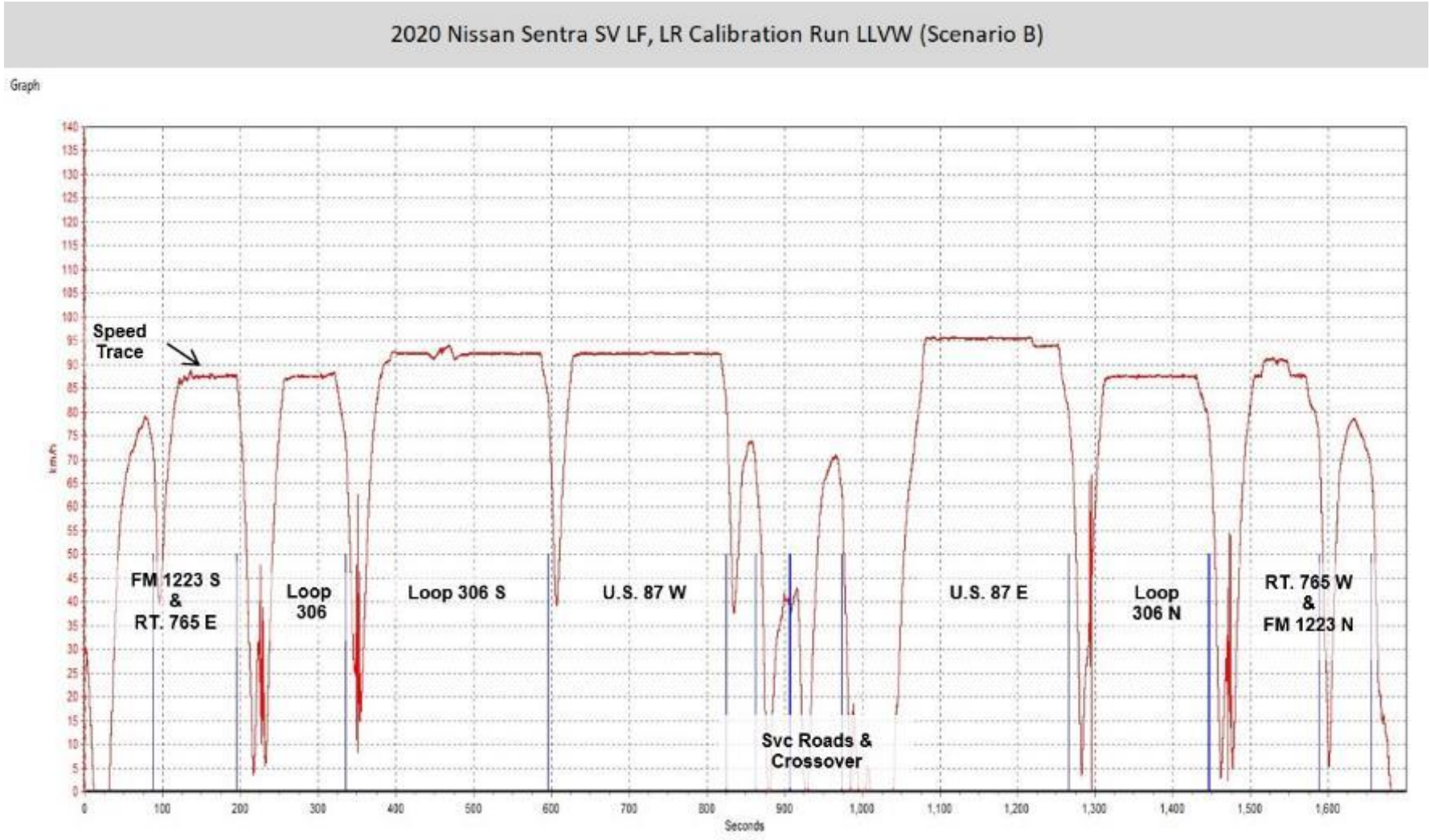
Scenario A: Left Front Tire at LLVW
Test Date: 04/13/20
Data File Time: 28:20 minutes
Cumulative Driving Time: 20:45 minutes
Start Point: GAFB South Gate

Calibration Phase:



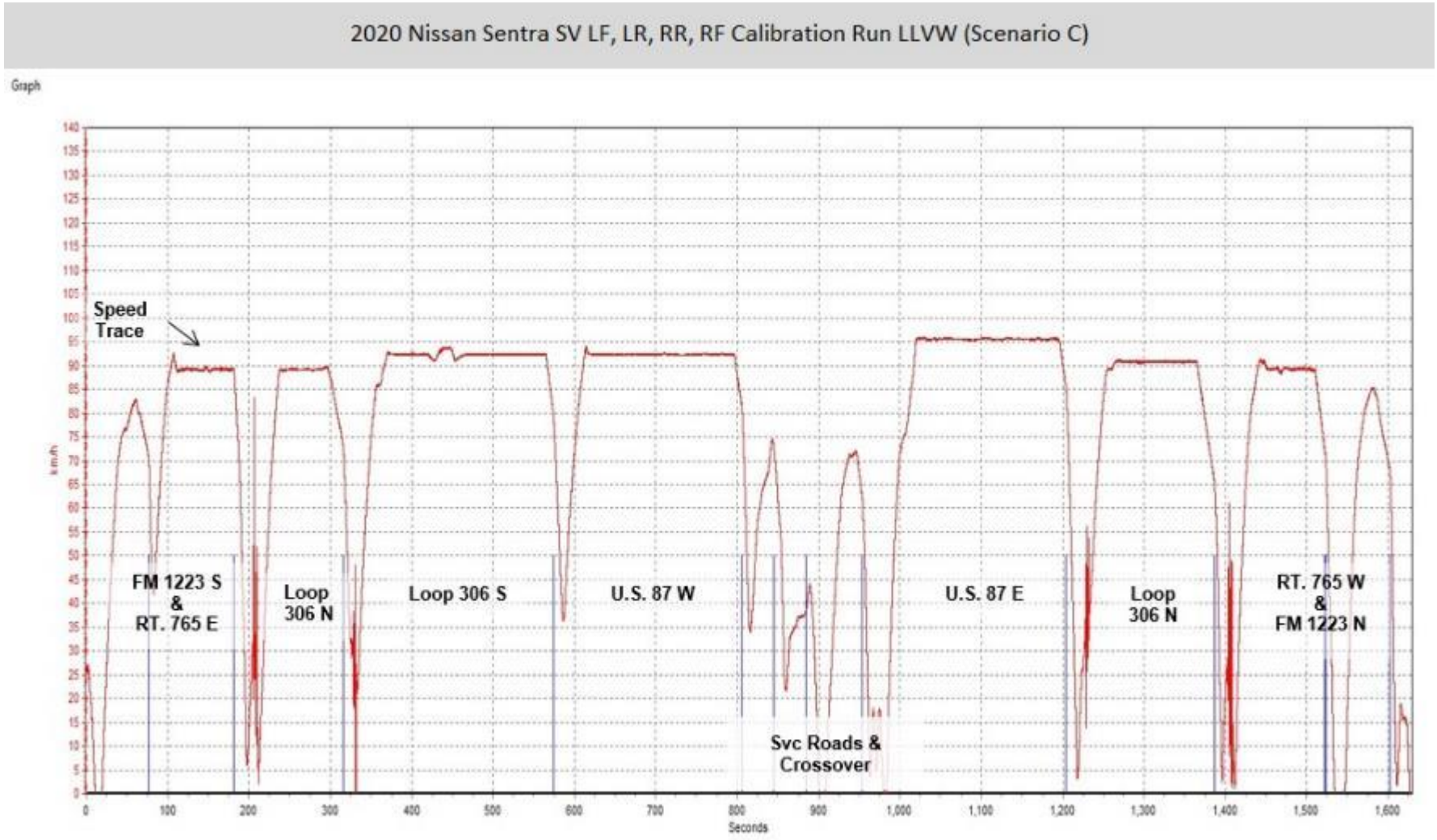
Scenario B: Left Front and Left Rear Tires at LLVW
Test Date: 04/14/20
Data File Time: 28:20 minutes
Cumulative Driving Time: 20:45 minutes
Start Point: GAFB South Gate

Calibration Phase:



Scenario C:	Left Front, Left Rear, Right Rear, and Right Front Tires at LLVW
Test Date:	04/21/20
Data File Time:	27:09 minutes
Cumulative Driving Time:	20:42 minutes
Start Point:	GAFB South Gate

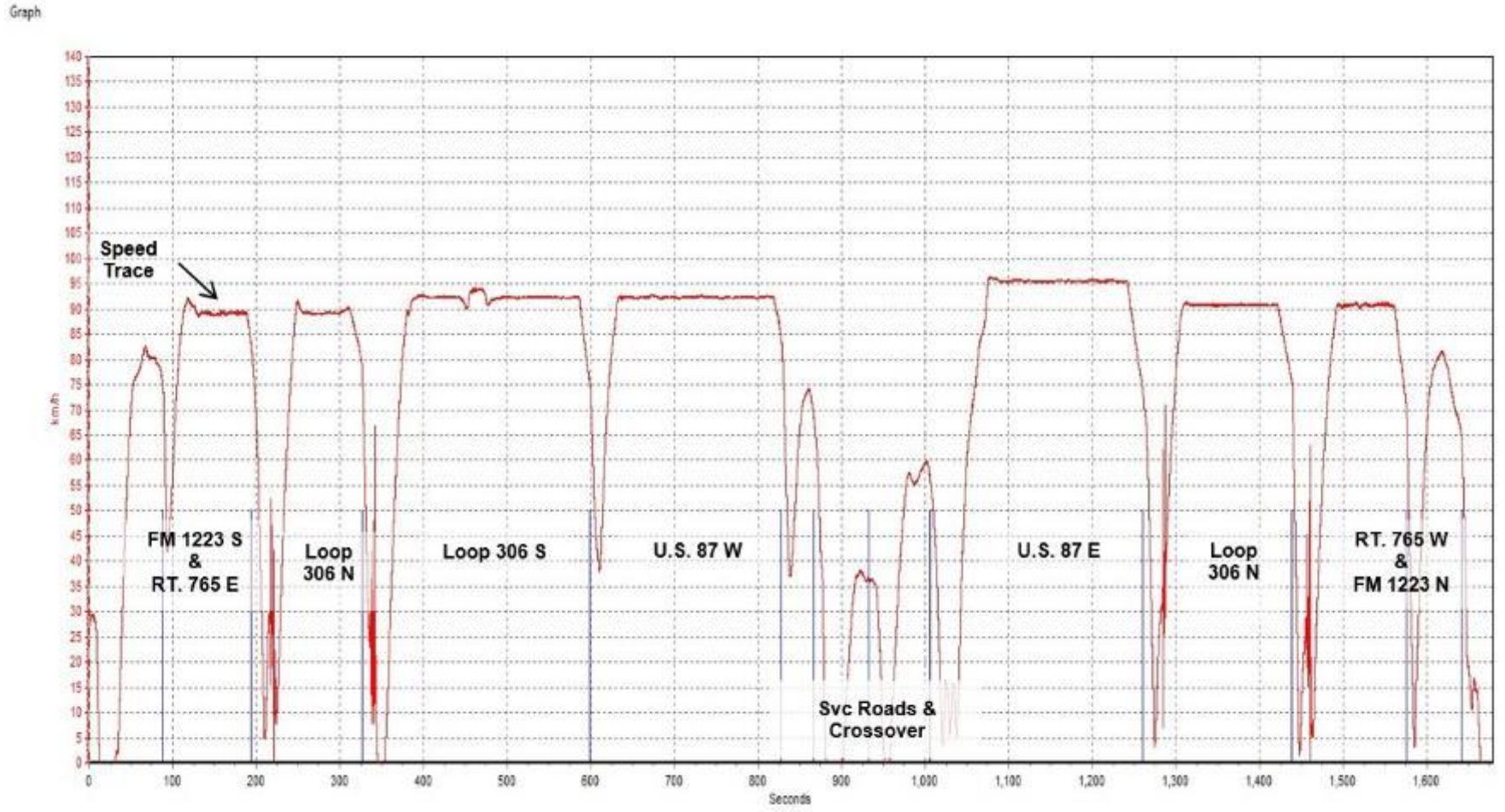
Calibration Phase:



Scenario D: Left Front and Right Front Tires at UVW+VCW
Test Date: 4/27/20
Data File Time: 28:00 minutes
Cumulative Driving Time: 20:45 minutes
Start Point: GAFB South Gate

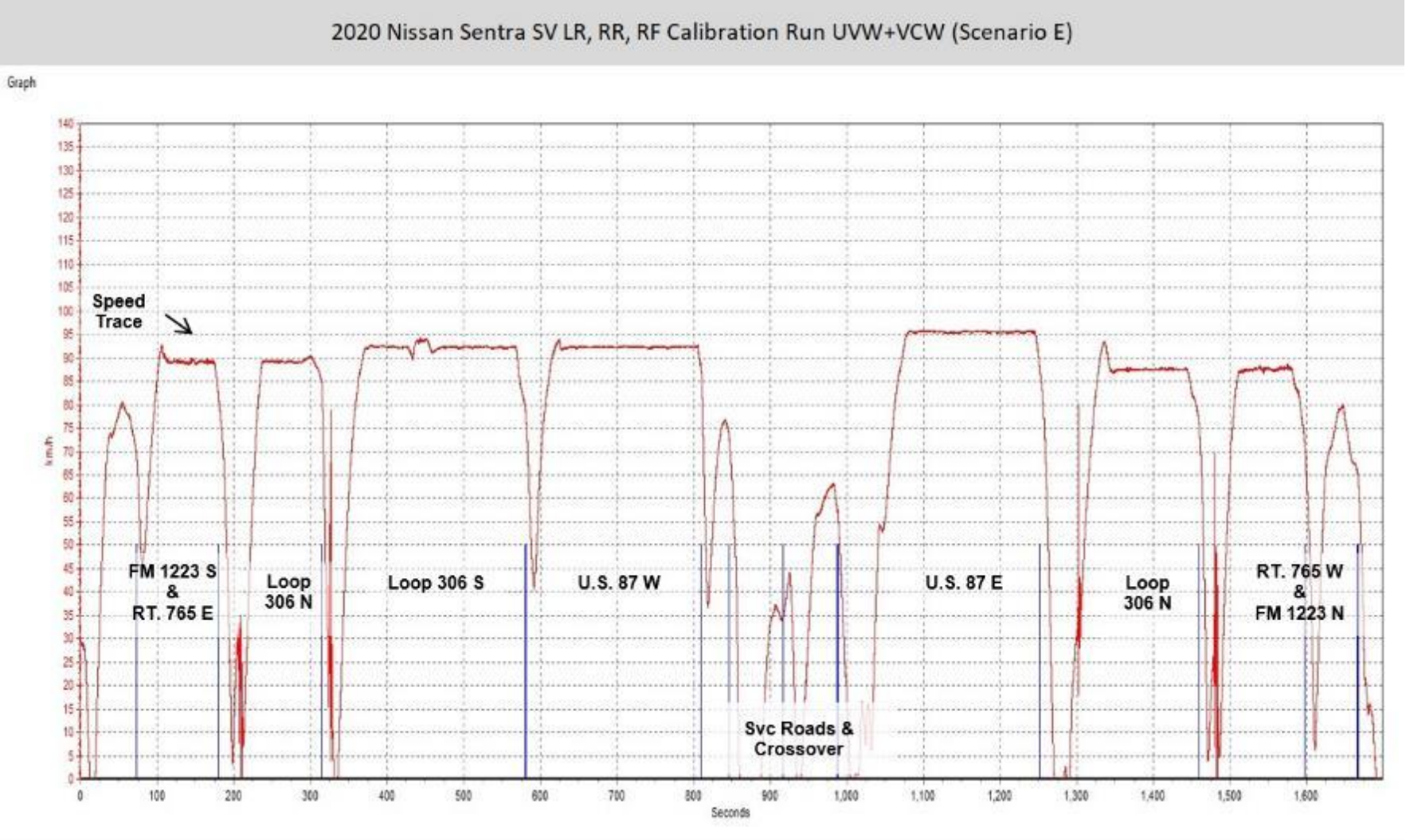
Calibration Phase:

2020 Nissan Sentra SV LF, RF Calibration Run UVW+VCW (Scenario D)



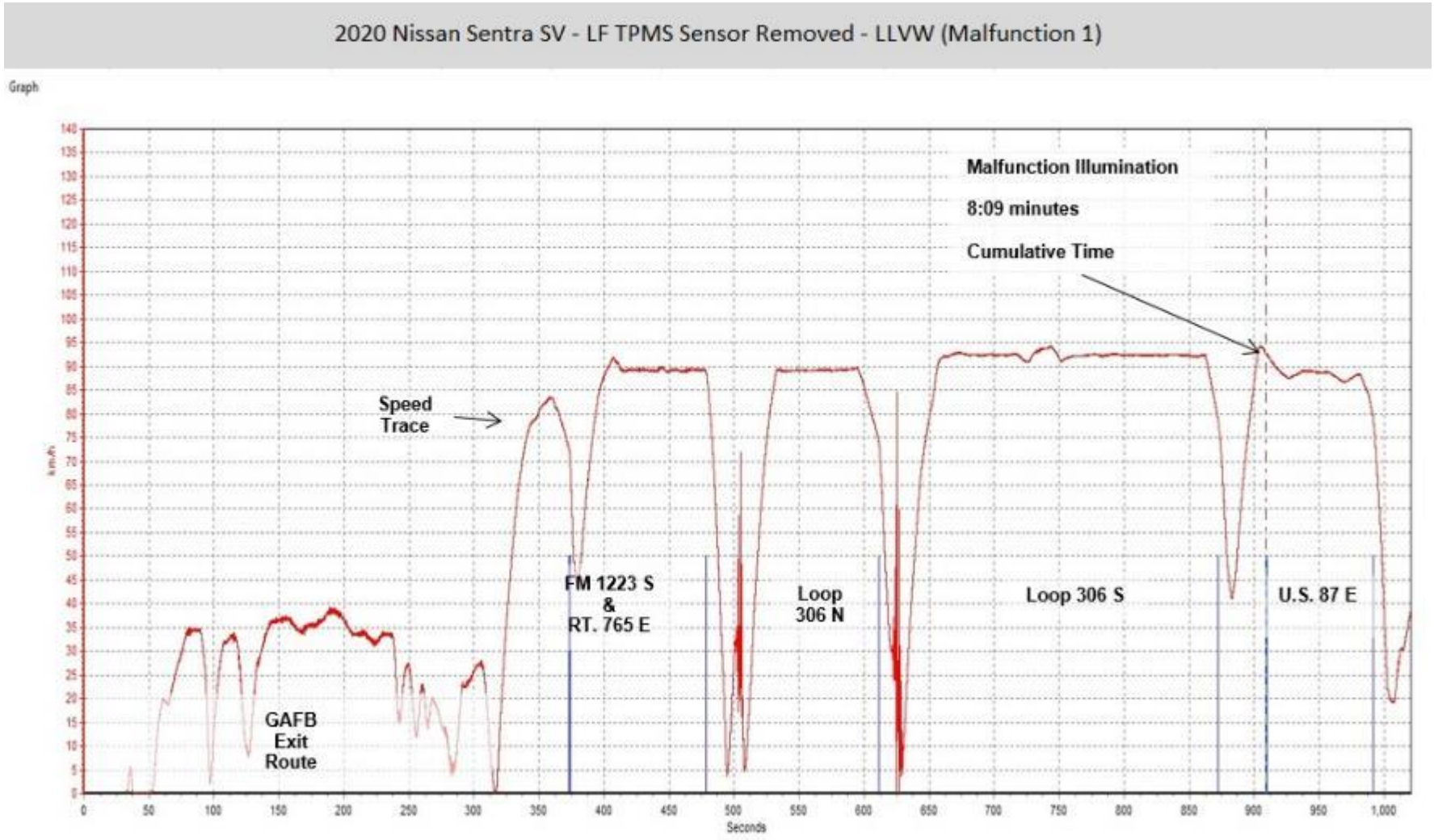
Scenario E:	Left Rear, Right Rear, and Right Front Tires at UVW+VCW
Test Date:	4/27/20
Data File Time:	28:19 minutes
Cumulative Driving Time:	20:43 minutes
Start Point:	GAFB South Gate

Calibration Phase:



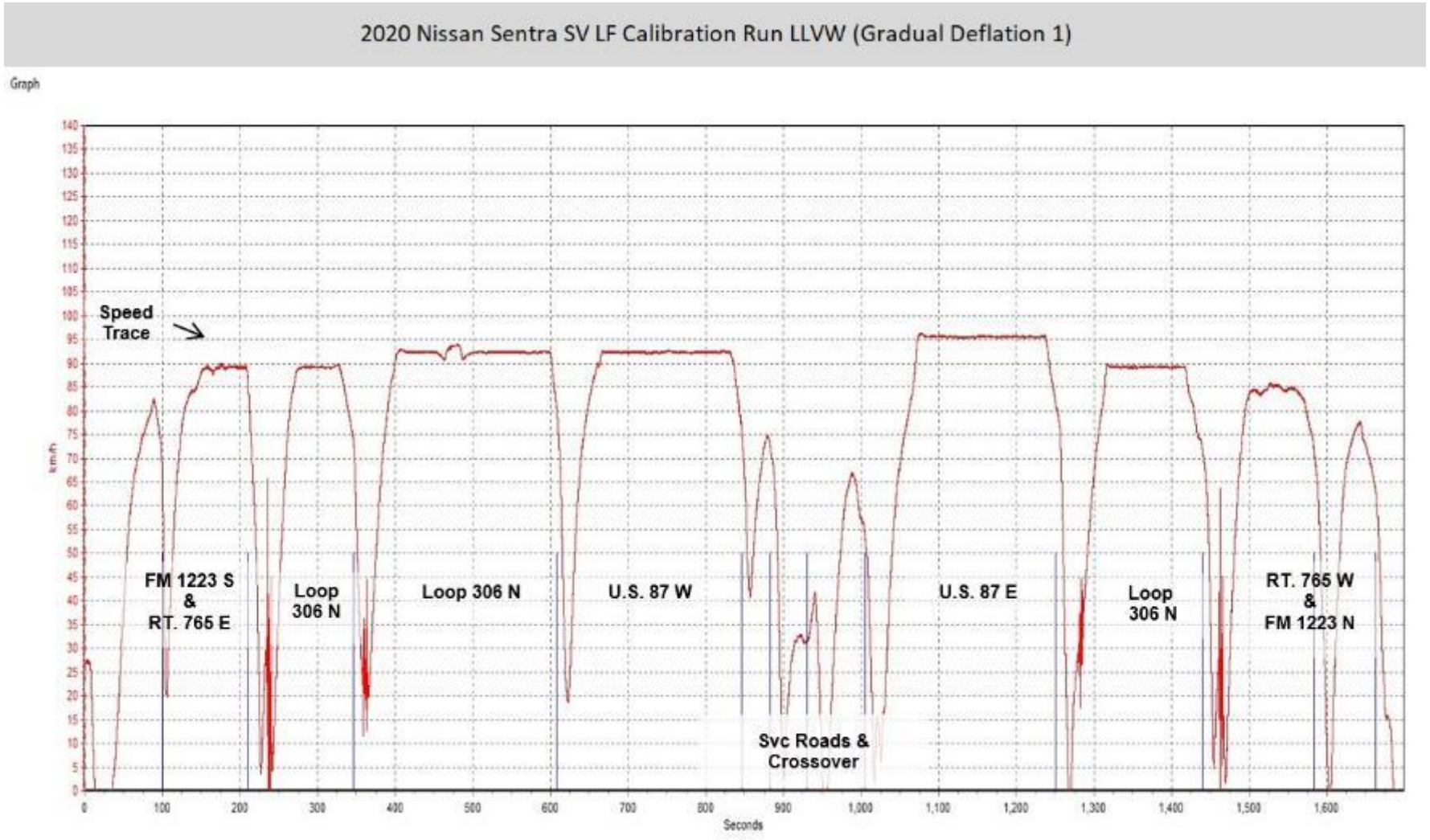
Malfunction 1:	TPMS Left Front Sensor Removed at LLVW
Test Date:	4/21/20
Data File Time:	17:01 minutes
Cumulative Driving Time:	08:09 minutes
Start Point:	San Angelo Test Facility Shop

Detection Phase:



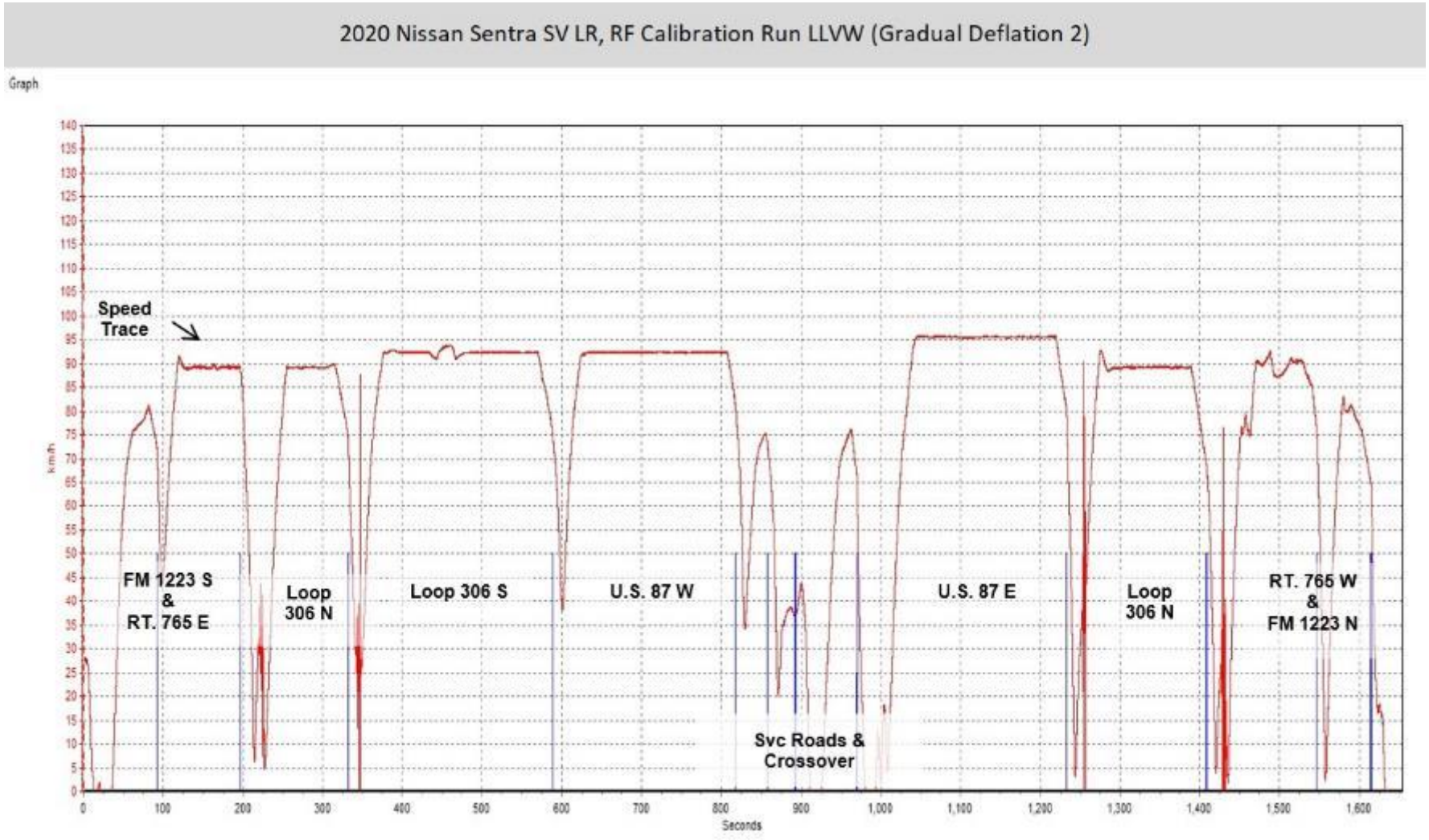
Gradual Deflation 1: Left Front Tire at LLVW – Calibration at 230 kPa
Test Date: 4/22/20
Data File Time: 28:19 minutes
Cumulative Driving Time: 20:45 minutes
Start Point: GAFB South Gate

Calibration Phase:



Gradual Deflation 2:	Left Rear and Right Front Tires at LLVW – Calibration at 230 kPa
Test Date:	4/23/20
Data File Time:	27:34 minutes
Cumulative Driving Time:	20:45 minutes
Start Point:	GAFB South Gate

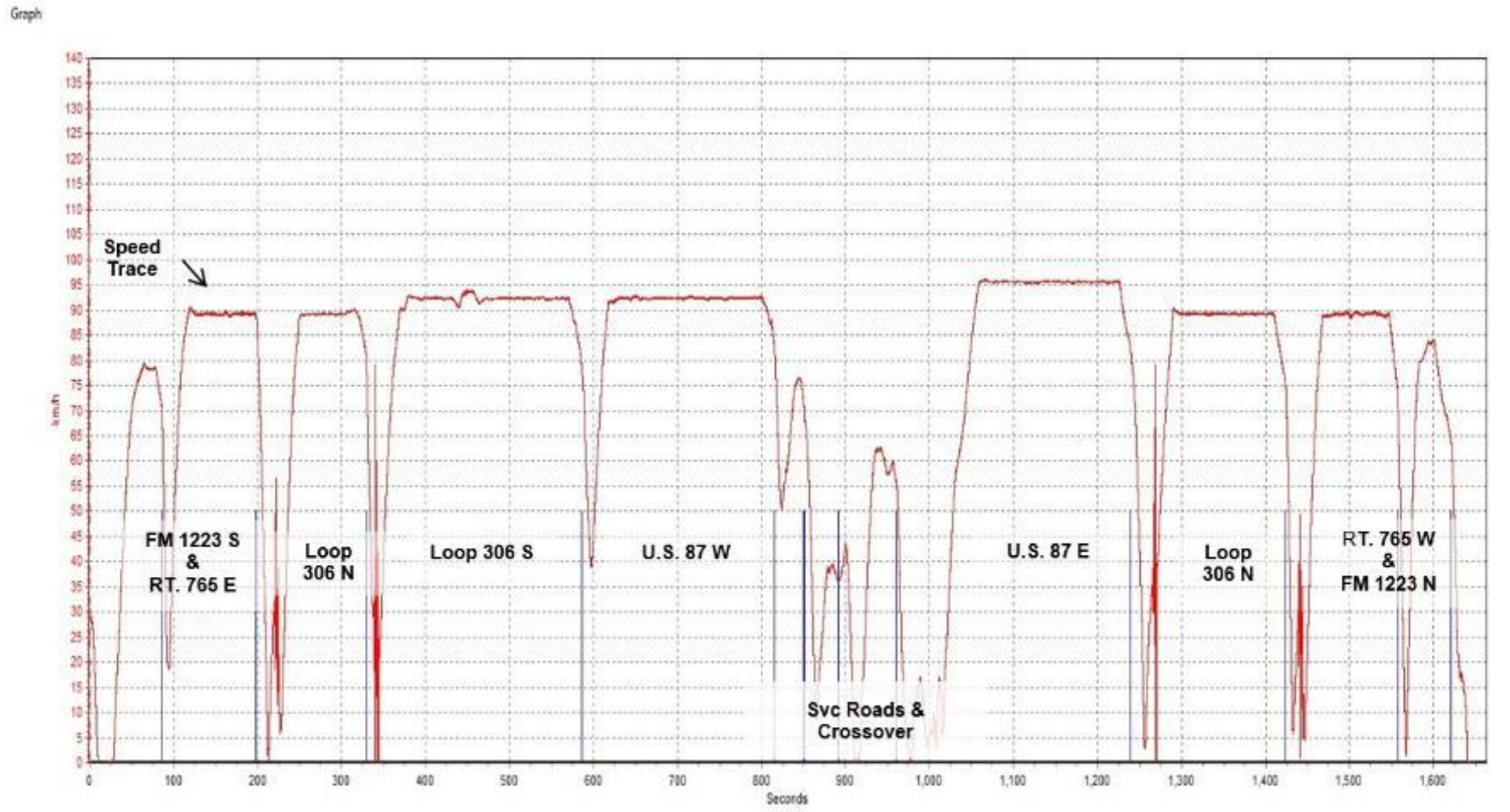
Calibration Phase:



Gradual Deflation 3: Left Front, Left Rear, and Right Rear Tires at LLVW – Calibration at 230 kPa
Test Date: 4/24/20
Data File Time: 27:44 minutes
Cumulative Driving Time: 20:47 minutes
Start Point: GAFB South Gate

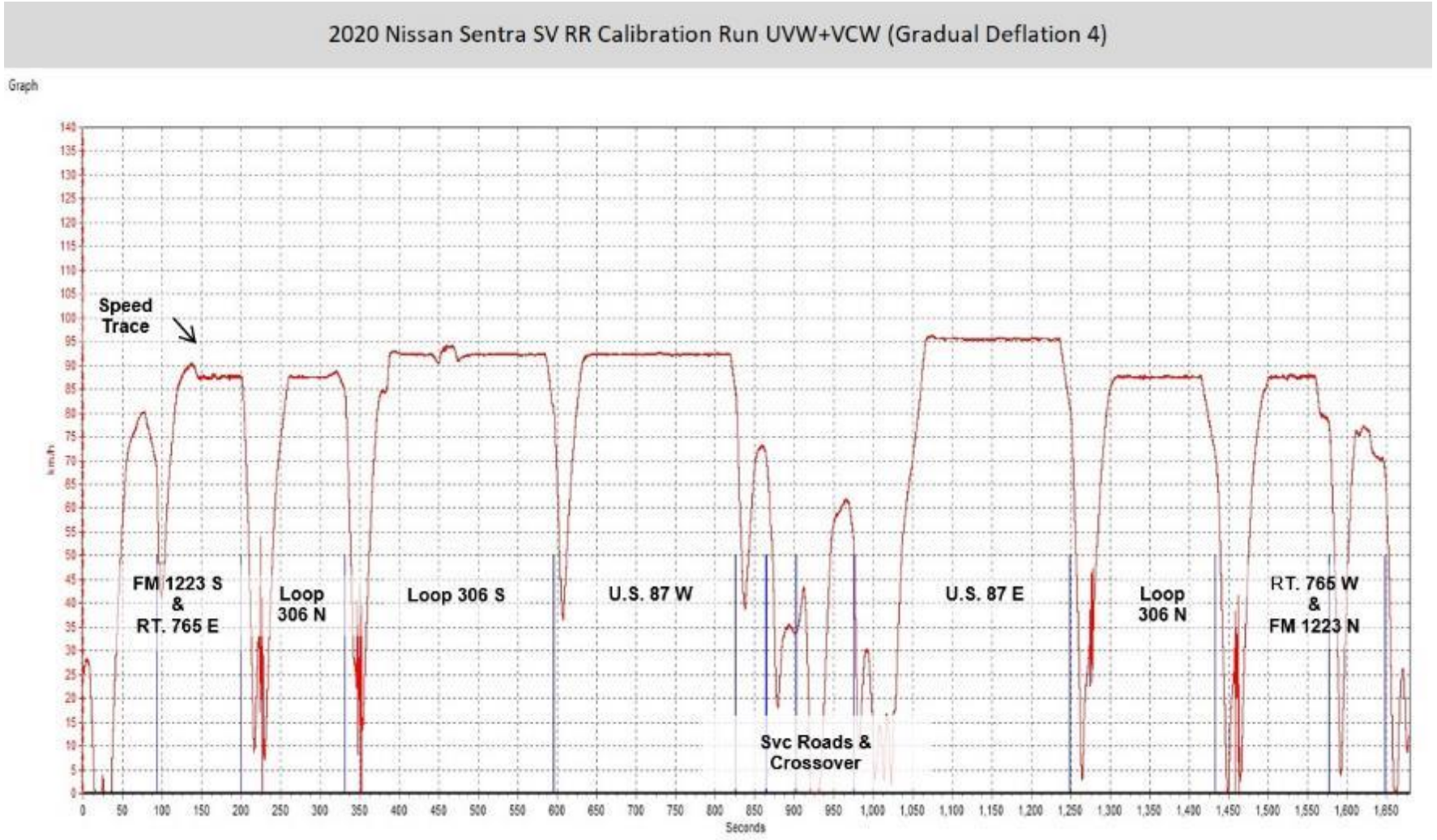
Calibration Phase:

2020 Nissan Sentra SV LF, LR, RR Calibration Run LLVW (Gradual Deflation 3)



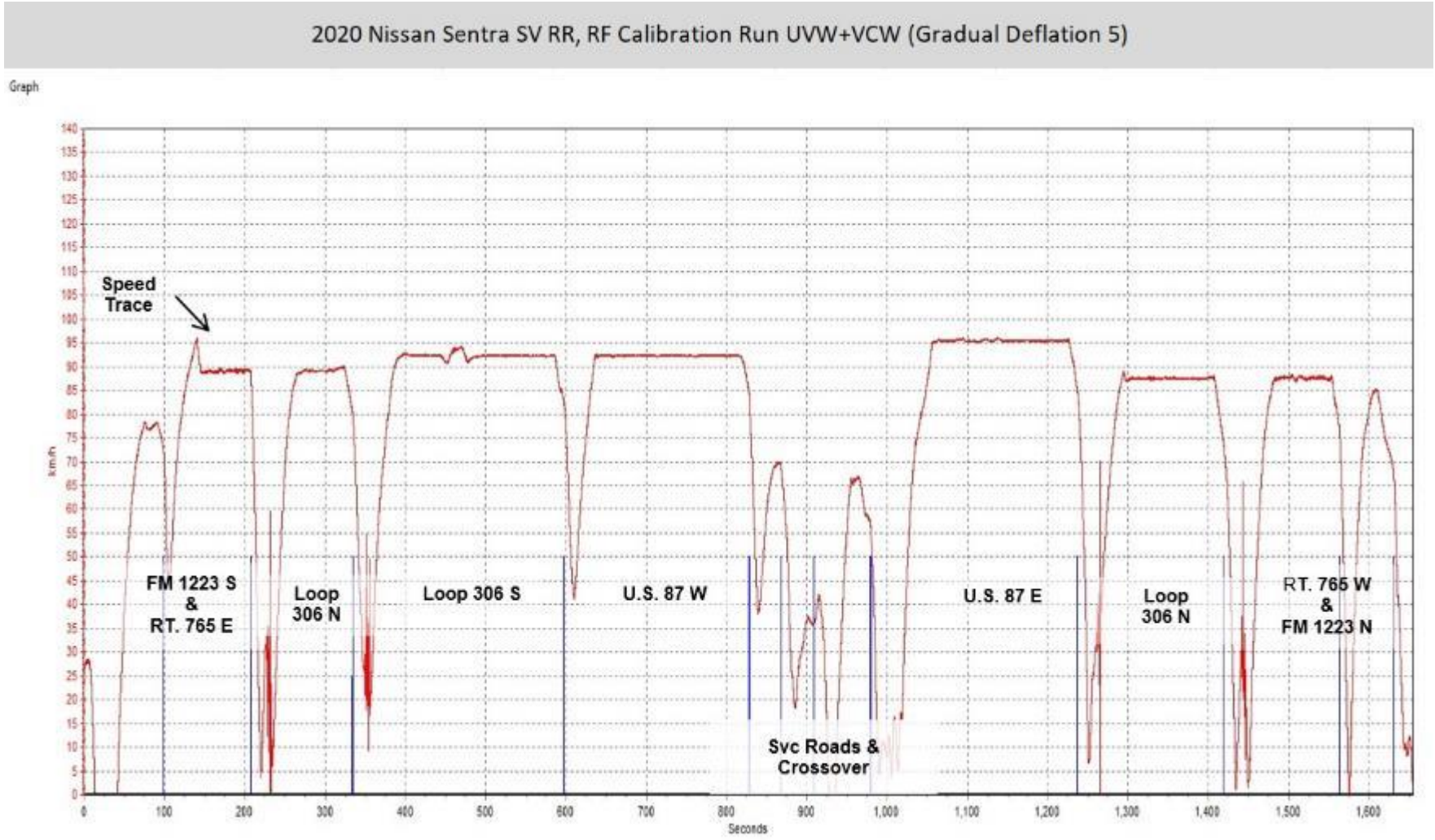
Gradual Deflation 4: Right Rear Tire at UVW+VCW – Calibration at 230 kPa
Test Date: 4/28/20
Data File Time: 27:59 minutes
Cumulative Driving Time: 20:43 minutes
Start Point: GAFB South Gate

Calibration Phase:



Gradual Deflation 5: Right Rear and Right Front Tires at UVW+VCW – Calibration at 230 kPa
Test Date: 4/29/20
Data File Time: 27:36 minutes
Cumulative Driving Time: 20:42 minutes
Start Point: GAFB South Gate

Calibration Phase:



SECTION 7
OWNER'S MANUAL PAGES

- **Do not stop or park the vehicle over flammable materials such as dry grass, waste paper or rags. They may ignite and cause a fire.**

⚠ CAUTION

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

TIRE PRESSURE MONITORING SYSTEM (TPMS)

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

As an added safety feature, your vehicle has been equipped with a Tire Pressure Monitoring System (TPMS) that illuminates a low tire pressure telltale when one or more of your tires is significantly underinflated. 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 underinflated tire causes the tire to overheat and can lead to tire failure. Under-inflation also reduces fuel efficiency and tire tread life, and may affect the vehicle's handling and stopping ability.

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

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

Additional information:

- When replacing a wheel without the TPMS such as the spare tire, the TPMS does not monitor the tire pressure of the spare tire.
- The TPMS will activate only when the vehicle is driven at speeds above 16 mph (25 km/h). Also, this system may not detect a sudden drop in tire pressure (for example, a flat tire while driving).
- The low tire pressure warning light does not automatically turn off when the tire pressure of all your tires is adjusted. After the tires are inflated to the recommended pressure, the vehicle must be driven at speeds above 16 mph (25 km/h) to activate the TPMS and turn off the low tire pressure warning light. Use a tire pressure gauge to check the tire pressure.
- The "CHECK TIRE PRES" (Type A - if so equipped) or the "Tire Pressure Low - Add Air" (Type B - if so equipped) warning message is displayed in the odometer when the low tire pressure warning light is illuminated and low tire pressure is detected. The "CHECK TIRE PRES" (Type A - if so equipped) or the "Tire Pressure Low - Add Air" (Type B - if so equipped) warning message turns off when the low tire pressure warning light turns off. The low tire pressure warning light remains illuminated until the tires are inflated to the recommended COLD tire pressure. The "CHECK TIRE PRES" (Type A - if so equipped) or the "Tire Pressure Low - Add Air" (Type B - if so equipped) warning message is displayed each time the ignition switch is placed in the ON position as long as the low tire pressure warning light remains illuminated.
- The "CHECK TIRE PRES" (Type A - if so equipped) or the "Tire Pressure Low - Add Air" (Type B - if so equipped) warning is not displayed if the low tire pressure warning light illuminates to indicate a TPMS malfunction.
- Tire pressure rises and falls depending on the heat caused by the vehicle's operation and the outside temperature. Do not reduce the tire pressure after driving because the tire pressure rises after driving. Low outside temperature can lower the temperature of the air inside the tire which can cause a lower tire inflation pressure. This may cause the low tire pressure warning light to illuminate. If the warning light illuminates, check the tire pressure for all four tires.
- The Tire and Loading Information label is located in the driver's door opening.

For additional information, refer to "Check tire pressure warning message" or "Low tire pressure warning light" in the "Instruments and controls" section and "Tire Pressure Monitoring System (TPMS)" in the "In case of emergency" section of this manual.

⚠ WARNING

- **Radio waves could adversely affect electric medical equipment. Those who use a pacemaker should contact the electric medical equipment manufacturer for the possible influences before use.**

- **If the low tire pressure warning light illuminates while driving, avoid sudden steering maneuvers or abrupt braking, reduce vehicle speed, pull off the road to a safe location and stop the vehicle as soon as possible. Driving with under-inflated tires may permanently damage the tires and increase the likelihood of tire failure. Serious vehicle damage could occur and may lead to an accident and could result in serious personal injury. Check the tire pressure for all four tires. Adjust the tire pressure to the recommended COLD tire pressure shown on the Tire and Loading Information label to turn the low tire pressure warning light off. If you have a flat tire, replace it with a spare tire as soon as possible. (For additional information on changing a flat tire, refer to "Flat tire" in the "In case of emergency" section of this manual.)**
- **When replacing a wheel without the TPMS such as the spare tire, when a spare tire is mounted or a wheel is replaced, the TPMS will not function and the low tire pressure warning light will flash for approximately 1 minute. The light will remain on after 1 minute. Have your tires replaced and/or TPMS reset as soon as possible. It is recommended that you visit a NISSAN dealer for this service.**
- **Replacing tires with those not originally specified by NISSAN could affect the proper operation of the TPMS.**
- **Do not inject any tire liquid or aerosol tire sealant into the tires, as this may cause a malfunction of the tire pressure sensors.**

⚠ CAUTION

Do not place metalized film or any metal parts (antenna, etc.) on the windows. This may cause poor reception of the signals from the tire pressure sensors, and the TPMS will not function properly.

Some devices and transmitters may temporarily interfere with the operation of the TPMS and cause the low tire pressure warning light to illuminate.

Some examples are:

- Facilities or electric devices using similar radio frequencies are near the vehicle.
- If a transmitter set to similar frequencies is being used in or near the vehicle.
- If a computer (or similar equipment) or a DC/AC converter is being used in or near the vehicle.

The low tire pressure warning light may illuminate in the following cases:

- If the vehicle is equipped with a wheel and tire without TPMS.
- If the TPMS has been replaced and the ID has not been registered.
- If the wheel is not originally specified by NISSAN.

FCC Notice:

For USA:

This device complies with Part 15 of the FCC Rules. Operation is subject to the 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.

NOTE:
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For Canada:

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

TPMS with Easy-Fill Tire Alert

When adding air to an under-inflated tire, the TPMS with Easy-Fill Tire Alert provides visual and audible signals outside the vehicle to help you inflate the tires to the recommended COLD tire pressure.

Vehicle set-up:

1. Park the vehicle in a safe and level place.
2. Apply the parking brake and place the shift lever in the P (Park) position (if so equipped).
3. Place the ignition switch in the ON position. Do not start the engine.

Operation:

1. Add air to the tire.
2. After a few seconds, the hazard indicators will start flashing.
3. When the designated pressure is reached, the horn beeps once and the hazard indicators stop flashing.
4. Perform the above steps for each tire.
   - If the tire is over-inflated more than approximately 4 psi (30 kPa), the horn beeps and the hazard indicators flash three times. To correct the pressure, push the core of the valve stem on the tire briefly to release pressure. When the pressure reaches the designated pressure, the horn beeps once.
   - If the hazard indicator does not flash within approximately 15 seconds after starting to inflate the tire, it indicates that the Easy-Fill Tire Alert is not operating.
     - The TPMS will not activate the Easy-Fill Tire Alert under the following conditions:
       - If there is interference from an external device or transmitter.
       - The air pressure from the inflation device is not sufficient to inflate the tire.
       - There is a malfunction in the TPMS system.
       - There is a malfunction in the horn or hazard indicators.
       - The identification code of the tire's pressure sensor is not registered to the system.
       - The battery of the tire pressure sensor is low.
     - If the Easy-Fill Tire Alert does not operate due to TPMS interference, move the vehicle about 3 ft (1 m) backward or forward and try again.

If the Easy-Fill Tire Alert is not working, use a tire pressure gauge.