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

KIA MOTORS CORPORATION
2009 KIA RONDO
FOUR-DOOR PASSENGER CAR
NHTSA NO. C90505

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

April 30, 2009
FINAL REPORT

PREPARED FOR
U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
NVS-220
OFFICE OF VEHICLE SAFETY COMPLIANCE
1200 NEW JERSEY AVENUE, SE
WASHINGTON, D.C. 20590
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Prepared By: Doris Sable

Approved By: [Signature]

Accepted By: [Signature]

Acceptance Date: 4/30/09
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<tbody>
<tr>
<td>Jack Stewart, Junior Systems Analyst</td>
</tr>
<tr>
<td>Todd P. Groghan, Safety Compliance Engineer</td>
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<tr>
<td>Kenneth H. Yates, Safety Compliance Engineer</td>
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<td>Office of Vehicle Safety Compliance, NVS 220</td>
</tr>
<tr>
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<td>Washington, DC  20590</td>
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<th>15. Supplementary Notes</th>
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<tr>
<td>Compliance tests were conducted on the subject 2009 Kia Rondo four-door passenger car in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure Number TP-138-03 for the determination of FMVSS 138 compliance. Test failures identified were as follows: NONE.</td>
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<tr>
<td>Technical Information Services Division</td>
</tr>
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<td>NPO-411, Room E12-100</td>
</tr>
<tr>
<td>1200 New Jersey Avenue, S.E.</td>
</tr>
<tr>
<td>Washington, DC  20590</td>
</tr>
<tr>
<td>Email:  <a href="mailto:tis@dot.gov">tis@dot.gov</a></td>
</tr>
<tr>
<td>FAX:    202-493-2833</td>
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction ................................................................................................................ 1</td>
</tr>
<tr>
<td>2</td>
<td>Test Procedure and Summary of Results ................................................................................ 2</td>
</tr>
</tbody>
</table>
| 3 | Test Data ................................................................................................................ 4  
  Test Data Summary ........................................................................................................ 5 |
|  | Vehicle Weigh-in for LLVW ..................................................................................................... 12 |
|  | Scenario A – Right Rear Tire Deflation at LLVW ................................................................. 13 |
|  | Scenario B – Left Rear and Right Front Tire Deflation at LLVW ............................................. 16 |
|  | Scenario C – Left Front, Left Rear, Right Rear, Right Front Tire Deflation at LLVW ............. 19 |
|  | Vehicle Weigh-in for UVW + VCW ............................................................................................ 23 |
|  | Scenario D – Left Front Tire Deflation at UVW + VCW .......................................................... 24 |
|  | Scenario E – Right Rear, Right Front Tire Deflation at UVW + VCW ........................................ 27 |
|  | Scenario F – Left Front, Right Rear, Right Front Tire Deflation at UVW + VCW ...................... 30 |
|  | Scenario G – Malfunction Detection Test at LLVW ................................................................. 33 |
|  | Scenario H – Malfunction Detection Test .................................................................................. 35 |
|  | TPMS Written Instructions ..................................................................................................... 37 |
| 4 | Test Equipment List and Calibration Information ........................................................................ 40 |
| 5 | Photographs ...................................................................................................................... 41 |
|  | Figure  
  5.1 ¾ Front View from Left Side of Vehicle  
  5.2 Vehicle Certification Label  
  5.3 Vehicle Placard  
  5.4 Tire Showing Brand  
  5.5 Tire Showing Model  
  5.6 Tire Showing Size and Load Index / Speed Rating  
  5.7 Tire Showing DOT Serial Number  
  5.8 Tire Showing Max Load Rating and Max Cold Inflation Pressure  
  5.9 Tire Showing Sidewall / Tread Construction  
  5.10 TPMS Sensor  
  5.11 Rim Contour for Full Width of Cross Section  
  5.12 Display Showing Low Tire Pressure Warning Telltale  
  5.13 Display Showing Dedicated TPMS Malfunction Warning Telltale  
  5.14 Test Instrumentation Installed in Vehicle  
  5.15 Vehicle Mid Seat Ballast for UVW + VCW Load  
  5.16 Vehicle Rear Seat Ballast for UVW + VCW Load  
  5.17 Vehicle Cargo Area Ballast for UVW + VCW Load  
  5.18 Vehicle on Weight Scales  
  5.19 Spare Installed on Right Front for Malfunction Detection Test  
  5.20 TPMS Fuse Removed for Malfunction Detection Test |
| 6 | Test Plots ...................................................................................................................... 62 |
| 7 | Owner’s Manual Pages ........................................................................................................ 70 |
SECTION 1
INTRODUCTION

1.1 PURPOSE OF COMPLIANCE TEST

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

1.2 TEST VEHICLE

The test vehicle was a 2009 Kia Rondo four-door passenger car. Nomenclatures applicable to the test vehicle are:

A. Vehicle Identification Number: KNAFG528X97227753

B. NHTSA Number: C90505

C. Manufacturer: Kia Motors Corporation

D. Manufacture Date: 06/2008

1.3 TEST DATE

The test vehicle was tested during the time period April 14 through April 22, 2009.
SECTION 2
TEST PROCEDURE AND SUMMARY OF RESULTS

2.1 TEST PROCEDURE

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

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

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

The tire deflation test scenario consisted of four phases:

1. Calibration phase: Tires were set at vehicle placard cold inflation pressure and the vehicle was driven for at least twenty minutes of cumulative driving time between 50 and 100 km/h.
2. Detection phase: Immediately after calibration phase, the selected tire(s) were deflated to seven kPa (one psi) below the Telltale Warning Activation Pressure. After one minute, the inflation pressure(s) of only deflated tire(s) were rechecked and adjusted if necessary. The vehicle was started and driven to ensure that the low inflation pressure telltale illuminated, unless the TPMS low tire pressure telltale illuminated prior to engaging of transmission.

3. Cool down phase: Vehicle was parked in the San Angelo Test Facility (SATF) open bay shielded from direct sunlight. Tires were allowed to cool down for a minimum of one hour. After cool down, the vehicle was started and the low tire pressure telltale was checked for re-illumination.

4. Extinguishment phase: Tires were adjusted to vehicle placard cold inflation pressure. The vehicle was started and driven to ensure that the low inflation pressure telltale extinguished, unless the TPMS low tire pressure telltale extinguished prior to engaging of transmission.

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

2.2 SUMMARY OF RESULTS

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

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

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

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

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

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

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

A second malfunction detection scenario was performed on the test vehicle:

H. The TPMS fuse was removed.

In both scenarios, the vehicle’s dedicated malfunction telltale properly operated per the standard’s requirements.
SECTION 3
TEST DATA
## FMVSS No. 138 – TEST DATA SUMMARY

**TEST DATES:** April 14 – April 22, 2009  
**LAB:** U. S. DOT San Angelo Test Facility  
**VIN:** KNAFG528X97227753  
**VEHICLE NHTSA NUMBER:** C90505  
**CERTIFICATION LABEL BUILD DATE:** 06/2008

### REQUIREMENTS

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

None
DATA SHEET 1 (Sheet 1 of 3)
TEST PREPARATION INFORMATION

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

VEHICLE NHTSA NUMBER: C90505
VIN: KNAFG528X97227753

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

MY/MAKE/MODEL/BODY STYLE: 2009 Kia Rondo four-door passenger car

TIRE CONDITIONING:
(X) Tires used more than 100 km. Actual odometer reading: 106 km (66 mi)

VEHICLE ALIGNMENT AND WHEEL BALANCING:
Alignment checked: ( ) Front ( ) Rear (X) COTR waived
Wheels balanced: ( ) Front ( ) Rear (X) COTR waived

TPMS IDENTIFICATION:
TPMS MAKE/MODEL: Receiver: Lear
Sensor: Beru, part number 52933-2G200
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 (X) Dedicated Telltale ( ) Combination low tire pressure/malfunction telltale
DATA SHEET 1 (Sheet 2 of 3)
TEST PREPARATION INFORMATION

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

<table>
<thead>
<tr>
<th>Axle</th>
<th>Tire Size</th>
<th>Recommended Cold Inflation Pressure</th>
<th>Source</th>
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<tr>
<td>Front</td>
<td>P205/60R16</td>
<td>220 kPa (32 psi)</td>
<td>Vehicle placard</td>
</tr>
<tr>
<td>Rear</td>
<td>P205/60R16</td>
<td>220 kPa (32 psi)</td>
<td>Vehicle placard</td>
</tr>
</tbody>
</table>

INSTALLED TIRE DATA
Diagram - PASSENGER CAR Tire Labeling

Front and Rear Axles
Tire Size and Load Index / Speed Rating: P205/60R16 91H
Manufacturer/Tire Name: Michelin Energy MXV4 S8
Sidewall Max Load Rating: 615 kg (1,356 lbs)
Max Inflation Pressure: 300 kPa (44 psi)
Sidewall Construction (number of plies and ply material): 1 polyester
Tread Construction (number of plies and ply material): 1 polyester, 2 steel, 1 polyamide

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
Worksheet for Determining FMVSS No. 138 Telltale Warning Activation Pressure for Tires Installed on Vehicle

<table>
<thead>
<tr>
<th>Part</th>
<th>Front Axle</th>
<th>Rear Axle</th>
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<tbody>
<tr>
<td>(A)</td>
<td>Recommended Inflation Pressure x .75</td>
<td>220 kPa x .75 = 165 kPa</td>
</tr>
<tr>
<td>(B)</td>
<td>Information from FMVSS 138 Table 1 below, Tire types are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inflation pressure</td>
<td>(X) P-metric-Standard load ( ) P-metric-Extra Load</td>
</tr>
<tr>
<td></td>
<td>Minimum activation pressures from Table 1</td>
<td>( ) Load Range ( ) C, ( ) D, or ( ) E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>140 kPa (20 psi)</td>
</tr>
<tr>
<td>(C)</td>
<td>Telltale Warning Activation Pressure is the higher of Part (A) or (B)</td>
<td>165 kPa (24 psi)</td>
</tr>
<tr>
<td>(D)</td>
<td>Pressure at which to deflate tire(s) = (C) – 7 kPa</td>
<td>158 kPa (23 psi)</td>
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</table>

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

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<tr>
<th>Tire Type</th>
<th>Maximum or Rated Inflation Pressure</th>
<th>Minimum Activation Pressure</th>
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<tr>
<td></td>
<td>(kPa)</td>
<td>(psi)</td>
</tr>
<tr>
<td>P-metric -- Standard Load</td>
<td>240, 300, or 350</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>P-metric - Extra Load</td>
<td>280 or 340</td>
<td>160</td>
</tr>
<tr>
<td></td>
<td>340</td>
<td></td>
</tr>
<tr>
<td>Load Range C</td>
<td>350</td>
<td>51</td>
</tr>
<tr>
<td>Load Range D</td>
<td>450</td>
<td>65</td>
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<tr>
<td>Load Range E</td>
<td>550</td>
<td>80</td>
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REMARKS: None

RECORDED BY: Todd P. Groghan
DATE: April 14, 2009
APPROVED BY: Kenneth H. Yates
DATA SHEET 2 (Sheet 1 of 2)
LOW TIRE PRESSURE WARNING AND MALFUNCTION TELLTALTE

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

VEHICLE NHTSA NUMBER: C90505

TPMS Low Tire Pressure Warning Telttale
Tell tale 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 Telttale Location: In gauge cluster to the left of tachometer

Identify Telttale Symbol Used (check box above figure).

Note any words or additional symbols used: None

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

TPMS Malfunction Telttale

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

TPMS Dedicated Malfunction Telttale Location: In gauge cluster, left of tachometer

Tell tale is mounted inside the occupant compartment in front of and in clear view of the driver?
( X )YES   ( )NO (fail)

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

Identify Dedicated Telttale Symbol Used: ( X ) “TPMS”   ( ) OTHER (fail)

Note any words or additional symbols used: None
DATA SHEET 2 (Sheet 2 of 2)
LOW TIRE PRESSURE WARNING AND MALFUNCTION TELLTALE

Check Telltale Lamp Functions:

LOW TIRE PRESSURE WARNING TELLTALE

Ignition locking system position when telltale illuminates:

☐ OFF/LOCK ☐ Between OFF/LOCK and ON/RUN

☒ ON/RUN ☐ Between ON/RUN and START

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

Time telltale remains illuminated 3 seconds.

DEDICATED TPMS MALFUNCTION TELLTALE

Ignition locking system position when telltale illuminates during lamp check:

☐ OFF/LOCK ☐ Between OFF/LOCK and ON/RUN

☒ ON/RUN ☐ Between ON/RUN and START

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

Time telltale remains illuminated 3 seconds.

Starter Interlocks:

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

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

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 14, 2009

APPROVED BY: Kenneth H. Yates
TEST DATE: April 15, 2009  
LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90505

Time: 
Start: 1:27 pm  
End: 2:01 pm

Ambient Temperature: 
Start: 23.0°C (73.4°F)  
End: 23.1°C (73.6°F)

Odometer Reading: 
Start: 106 km (66 mi)

Fuel Level: 
Start: Full

Weather Conditions: Overcast, slight breeze

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

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
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<tbody>
<tr>
<td>Pre-test cold measurements after ambient soak: Inflation Pressure</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
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<tr>
<td>Tire Sidewall Temp</td>
<td>22.6°C (72.7°F)</td>
<td>24.4°C (75.9°F)</td>
<td>24.6°C (76.3°F)</td>
<td>23.0°C (73.4°F)</td>
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### VEHICLE WEIGHT:

**Vehicle Ratings from Certification Label:**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GVWR</td>
<td>2,200 kg (4,850 lbs)</td>
<td></td>
</tr>
<tr>
<td>GAWR (front)</td>
<td>1,140 kg (2,513 lbs)</td>
<td></td>
</tr>
<tr>
<td>GAWR (rear)</td>
<td>1,180 kg (2,601 lbs)</td>
<td></td>
</tr>
</tbody>
</table>

**Vehicle Capacity Weight:**

Vehicle Capacity Weight  **525 kg (1,157 lbs)**

**Measured Unloaded Vehicle Weight:**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>466 kg (1,028 lbs)</td>
<td>LR</td>
</tr>
<tr>
<td>RF</td>
<td>449 kg (989 lbs)</td>
<td>RR</td>
</tr>
<tr>
<td>Front Axle</td>
<td>915 kg (2,017 lbs)</td>
<td>Rear Axle</td>
</tr>
</tbody>
</table>

Total Vehicle  **1,588 kg (3,500 lbs)**

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

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>519 kg (1,144 lbs)</td>
<td>LR</td>
</tr>
<tr>
<td>RF</td>
<td>508 kg (1,119 lbs)</td>
<td>RR</td>
</tr>
<tr>
<td>Front Axle</td>
<td>1,027 kg (2,263 lbs) ( ≤ GAWR)</td>
<td>Rear Axle</td>
</tr>
</tbody>
</table>

Total Vehicle  **1,793 kg (3,950 lbs)** (not greater than GVWR)

Note: For scenarios A, B, C, and G, this total vehicle weight measures the vehicle loaded to Lightly Loaded Vehicle Weight (LLVW), 204 kg (450 lbs) of driver, passenger, and test equipment.
DATA SHEET 3 (Sheet 3 of 22)
TPMS OPERATIONAL PERFORMANCE
SCENARIO A – Right Rear Tire Deflation at LLVW

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

VEHICLE NHTSA NUMBER: C90505

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

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to lightly loaded vehicle weight, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>18.1°C (64.6°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle cool down period:</td>
<td>overnight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure 220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td></td>
</tr>
<tr>
<td>Tire Sidewall Temp 18.8°C (65.8°F)</td>
<td>18.8°C (65.8°F)</td>
<td>18.8°C (65.8°F)</td>
<td>18.8°C (65.8°F)</td>
<td></td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp 19.0°C (66.2°F)</td>
<td>19.2°C (66.6°F)</td>
<td>19.2°C (66.6°F)</td>
<td>19.0°C (66.2°F)</td>
<td></td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

Trip Odometer Reading: Start: 107.8 km (67.0 mi) End: 139.7 km (86.8 mi)
Ambient Temperature: Start: 18.1°C (64.6°F) End: 18.1°C (64.6°F)
Roadway Temperature: Start: 19.2°C (66.6°F) End: 20.0°C (68.0°F)

Driving in first direction:
Goodfellow Air Force
Starting point: Base (GAFB) north gate Direction: see chart, page 63
10:12 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:
Starting point: US 87 crossover overpass Direction: see chart, page 63
10:27 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 99.0 km/h (61.5 mph)
Total Driving Time: 20:39 minutes (VBox time)
SCENARIO A – Right Rear Tire Deflation at LLVW

**TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>240.2 kPa(34.8 psi)</td>
<td>240.2 kPa(34.8 psi)</td>
<td>240.5 kPa(34.9 psi)</td>
<td>242.2 kPa(35.1 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>29.6°C(85.3°F)</td>
<td>27.2°C(81.0°F)</td>
<td>27.4°C(81.3°F)</td>
<td>30.0°C(86.0°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>19.4°C(66.9°F)</td>
<td>19.6°C(67.3°F)</td>
<td>19.6°C(67.3°F)</td>
<td>19.4°C(66.9°F)</td>
</tr>
</tbody>
</table>

**SYSTEM DETECTION PHASE:**

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(   )LF (   )LR ( X )RR (   )RF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td></td>
<td></td>
<td>158.0 kPa(22.9 psi)</td>
<td></td>
</tr>
</tbody>
</table>

**TELLTALE ILLUMINATION:**

Driving in first direction:
- Starting point:  San Angelo Test Facility shop  Direction:  west
- 1:20 minutes (stopwatch time – non-cumulative) 0.3 km (.2 mi) distance

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

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

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  ( X )YES  (   )NO (fail)
### DATA SHEET 3 (Sheet 5 of 22)
### TPMS OPERATIONAL PERFORMANCE

#### SCENARIO A – Right Rear Tire Deflation at LLVW

#### TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELTTALE ILLUMINATION:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation Pressure</td>
<td>226.7 kPa (32.9 psi)</td>
<td>226.5 kPa (32.9 psi)</td>
<td>149.6 kPa (21.7 psi)</td>
<td>228.0 kPa (33.1 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>20.6°C (69.1°F)</td>
<td>20.6°C (69.1°F)</td>
<td>21.8°C (71.2°F)</td>
<td>21.8°C (71.2°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>19.2°C (66.6°F)</td>
<td>19.6°C (67.3°F)</td>
<td>19.8°C (67.6°F)</td>
<td>19.4°C (66.9°F)</td>
</tr>
</tbody>
</table>

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

- (X) YES     ( ) NO (fail)

#### TELLTALE EXTINGUISHMENT:

#### RE-ADJUSTED TIRE INFLATION PRESSURES:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-adjusted Inflation Pressure</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
</tbody>
</table>

Is it necessary to drive the vehicle to extinguish the telltale?  

- (X) YES     ( ) NO

Starting point:  

- San Angelo Test Facility shop  

1:20 minutes (stopwatch time – non-cumulative)  

0.3 km (0.2 mi) distance

#### TEST RESULTS

TPMS Performance Test Results (PASS/FAIL)  

- PASS

Right rear tire was deflated at LLVW.

#### REMARKS:  

- None

---

RECORDED BY:  

- Jack R. Stewart  

DATE:  

- April 16, 2009

APPROVED BY:  

- Kenneth H. Yates
DATA SHEET 3 (Sheet 6 of 22)
TPMS OPERATIONAL PERFORMANCE
SCENARIO B – Left Rear and Right Front Tire Deflation at LLVW

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

VEHICLE NHTSA NUMBER: C90505

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

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to lightly loaded vehicle weight, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature: 21.5°C (70.7°F)</td>
<td>Vehicle cool down period: overnight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>20.4°C (68.7°F)</td>
<td>21.2°C (70.2°F)</td>
<td>20.8°C (69.4°F)</td>
<td>20.6°C (69.1°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>20.2°C (68.4°F)</td>
<td>20.6°C (69.1°F)</td>
<td>20.6°C (69.1°F)</td>
<td>20.2°C (68.4°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 16:57:06 UTC End: 17:21:35 UTC
Trip Odometer Reading: Start: 142.3 km (88.4 mi) End: 174.1 km (108.2 mi)
Ambient Temperature: Start: 21.5°C (70.7°F) End: 22.5°C (72.5°F)
Roadway Temperature: Start: 32.8°C (91.0°F) End: 35.6°C (96.1°F)

Driving in first direction:
Starting point: GAFB north gate Direction: see chart, page 64
10:12 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:
Starting point: US 87 crossover overpass Direction: see chart, page 64
10:25 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 97.9km/h (60.8 mph)
Total Driving Time: 20:37 minutes (VBox time)
DATA SHEET 3 (Sheet 7 of 22)
TPMS OPERATIONAL PERFORMANCE
SCENARIO B – Left Rear and Right Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>245.7 kPa (35.6 psi)</td>
<td>244.3 kPa (35.4 psi)</td>
<td>244.6 kPa (35.5 psi)</td>
<td>247.5 kPa (35.9 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>35.4°C (95.7°F)</td>
<td>33.4°C (92.1°F)</td>
<td>33.8°C (92.8°F)</td>
<td>34.2°C (93.6°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>20.2°C (68.4°F)</td>
<td>20.8°C (69.4°F)</td>
<td>20.6°C (69.1°F)</td>
<td>20.2°C (68.4°F)</td>
</tr>
</tbody>
</table>

SYSTEM DETECTION PHASE:

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( )LF ( X )LR ( )RR ( X )RF</td>
<td>158.0 kPa (22.9 psi)</td>
<td>158.0 kPa (22.9 psi)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop
Direction: west

1:20 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

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

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

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

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

**TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>25.5°C (77.9°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle cool down period:</td>
<td>60 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>230.5 kPa (33.4 psi)</td>
<td>148.5 kPa (21.5 psi)</td>
<td>228.0 kPa (33.1 psi)</td>
<td>148.0 kPa (21.5 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>25.4°C (77.7°F)</td>
<td>25.0°C (77.0°F)</td>
<td>24.8°C (76.6°F)</td>
<td>25.0°C (77.0°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>22.2°C (72.0°F)</td>
<td>22.2°C (72.0°F)</td>
<td>21.8°C (71.2°F)</td>
<td>22.0°C (71.6°F)</td>
</tr>
</tbody>
</table>

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

**TELLTALE EXTINGUISHMENT:**

**RE-ADJUSTED TIRE INFLATION PRESSURES:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After illumination verification:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
</tbody>
</table>

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

Starting point:  San Angelo Test Facility shop

1:26 minutes (stopwatch time – non-cumulative)  0.3 km (0.2 mi) distance

**TPMS Performance Test Results (PASS/FAIL):**  
PASS

Left rear and right front tires were deflated at LLVW.

**REMARKS:**  None

RECORDED BY:  Jack R. Stewart  
DATE:  April 17, 2009

APPROVED BY:  Kenneth H. Yates
TEST DATE: April 20, 2009   LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90505

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

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to lightly loaded vehicle weight, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>11.7°C (53.1°F)</td>
<td>Vehicle cool down period:</td>
<td>overnight</td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>14.4°C (57.9°F)</td>
<td>13.4°C (56.1°F)</td>
<td>14.2°C (57.6°F)</td>
<td>15.2°C (59.4°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>17.2°C (63.0°F)</td>
<td>17.2°C (63.0°F)</td>
<td>17.6°C (63.7°F)</td>
<td>17.4°C (63.3°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

Trip Odometer Reading: Start: 177.7 km (110.4 mi)   End: 209.5 km (130.2 mi)
Ambient Temperature: Start: 11.7°C (53.1°F)   End: 11.7°C (53.1°F)
Roadway Temperature: Start: 13.2°C (55.8°F)   End: 15.6°C (60.1°F)

Driving in first direction:
Starting point: GAFB north gate   Direction: see chart, page 65
10:11 minutes (stopwatch time)   15.8 km (9.8 mi) distance

Driving in opposite direction:
Starting point: US 87 crossover overpass   Direction: see chart, page 65
10:31 minutes (stopwatch time)   16.1 km (10.0 mi) distance

Max speed: 99.2 km/h (61.6 mph)
Total Driving Time: 20:42 minutes (VBox time)
DATA SHEET 3 (Sheet 10 of 22)
TPMS OPERATIONAL PERFORMANCE

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

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>242.2 kPa (35.1 psi)</td>
<td>241.0 kPa (35.0 psi)</td>
<td>241.5 kPa (35.0 psi)</td>
<td>241.8 kPa (35.1 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>26.4°C (79.5°F)</td>
<td>23.4°C (74.1°F)</td>
<td>22.0°C (71.6°F)</td>
<td>25.0°C (77.0°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>16.8°C (62.2°F)</td>
<td>16.4°C (61.5°F)</td>
<td>16.2°C (61.2°F)</td>
<td>16.4°C (61.5°F)</td>
</tr>
</tbody>
</table>

SYSTEM DETECTION PHASE:

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated: ( X )LF ( X )LR ( X )RR ( X )RF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>158.0 kPa (22.9 psi)</td>
<td>158.0 kPa (22.9 psi)</td>
<td>158.0 kPa (22.9 psi)</td>
<td>158.0 kPa (22.9 psi)</td>
</tr>
</tbody>
</table>

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop

Illumination immediately after lamp check. Driving was not necessary.

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

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

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? ( X )YES ( )NO (fail)
TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELTTLAE ILLUMINATION:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>15.7°C (60.3°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle cool down period:</td>
<td>62 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>149.3 kPa (21.7 psi)</td>
<td>149.5 kPa (21.7 psi)</td>
<td>149.8 kPa (21.7 psi)</td>
<td>150.1 kPa (21.8 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>17.4°C (63.3°F)</td>
<td>17.4°C (63.3°F)</td>
<td>17.6°C (63.7°F)</td>
<td>18.6°C (65.5°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>17.2°C (63.0°F)</td>
<td>17.2°C (63.0°F)</td>
<td>17.2°C (63.0°F)</td>
<td>17.6°C (63.7°F)</td>
</tr>
</tbody>
</table>

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

TELLTLE EXTINGUISHMENT:
RE-ADJUSTED TIRE INFLATION PRESSURES:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After illumination verification:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
</tbody>
</table>

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

TEST RESULTS

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

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 20, 2009
APPROVED BY: Kenneth H. Yates
DATA SHEET 3 (Sheet 12 of 22)
TPMS OPERATIONAL PERFORMANCE

TEST DATE: April 20, 2009  LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90505

Time: Start: 2:15 pm  End: 3:15 pm

Ambient Temperature: Start: 25.4°C (77.7°F)  End: 26.4°C (79.5°F)

Odometer Reading: Start: 238 km (148 mi)

Fuel Level: Start: Full

Weather Conditions: Sunny and calm

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

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test cold measurements after ambient soak: Inflation Pressure</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>25.2°C (77.4°F)</td>
<td>25.2°C (77.4°F)</td>
<td>25.2°C (77.4°F)</td>
<td>25.0°C (77.0°F)</td>
</tr>
</tbody>
</table>
### VEHICLE WEIGHT:

**Vehicle Ratings from Certification Label:**

- **GVWR:** 2,200 kg (4,850 lbs)
- **GAWR (front):** 1,140 kg (2,513 lbs)
- **GAWR (rear):** 1,180 kg (2,601 lbs)

**Vehicle Capacity Weight:**

- Vehicle Capacity Weight: 525 kg (1,157 lbs)

### Measured Unloaded Vehicle Weight:

- **LF:** 465 kg (1,026 lbs)
- **LR:** 337 kg (742 lbs)
- **RF:** 450 kg (991 lbs)
- **RR:** 336 kg (741 lbs)
- **Front Axle:** 915 kg (2,017 lbs)
- **Rear Axle:** 673 kg (1,483 lbs)
- **Total Vehicle:** 1,588 kg (3,500 lbs)

### Measured Test Weight:

- **LLVW (+50, -0 kg):** ( )
- **UVW + VCW:** ( X )
- **GVWR (+0, -50 kg):** ( )

- **LF:** 526 kg (1,159 lbs)
- **LR:** 539 kg (1,189 lbs)
- **RF:** 512 kg (1,129 lbs)
- **RR:** 535 kg (1,180 lbs)
- **Front Axle:** 1,038 kg (2,288 lbs) (≤ GAWR)
- **Rear Axle:** 1,074 kg (2,369 lbs) (≤ GAWR)
- **Total Vehicle:** 2,112 kg (4,657 lbs) (not greater than GVWR)

**Note:** For scenarios D, E, and F, this Total Vehicle Weight measures the vehicle loaded to Unloaded Vehicle Weight (UVW) and Vehicle Capacity Weight (VCW), 525 kg (1,157 lbs) of driver, passenger, test equipment, and ballast.
DATA SHEET 3 (Sheet 14 of 22)  
TPMS OPERATIONAL PERFORMANCE  
SCENARIO D – Left Front Tire Deflation at UVW + VCW

TEST DATE: April 21, 2009  
LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90505

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

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to UVW + VCW, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
<tr>
<td>Ambient Temperature: 16.1°C (61.0°F)</td>
<td>Tire Sidewall Temp: 17.8°C (64.0°F)</td>
<td>17.4°C (63.3°F)</td>
<td>17.4°C (63.3°F)</td>
<td>17.4°C (63.3°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp: 18.4°C (65.1°F)</td>
<td>18.6°C (65.5°F)</td>
<td>18.6°C (65.5°F)</td>
<td>18.6°C (65.5°F)</td>
<td></td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 13:29:20 UTC  
End: 13:53:54 UTC

Trip Odometer Reading: Start: 240.1 km (149.2 mi)  
End: 272.0 km (169.0 mi)

Ambient Temperature: Start: 16.1°C (61.0°F)  
End: 17.0°C (62.6°F)

Roadway Temperature: Start: 17.4°C (63.3°F)  
End: 20.8°C (69.4°F)

Driving in first direction:

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

10:12 minutes (stopwatch time)  
15.8 km (9.8 mi) distance

Driving in opposite direction:

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

10:25 minutes (stopwatch time)  
16.1 km (10.0 mi) distance

Max speed: 98.8 km/h (61.4 mph)

Total Driving Time: 20:37 minutes (VBox time)
DATA SHEET 3 (Sheet 15 of 22)
TPMS OPERATIONAL PERFORMANCE
SCENARIO D – Left Front Tire Deflation at UVW + VCW

TIRES INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off: Inflation Pressure</td>
<td>244.7 kPa (35.5 psi)</td>
<td>249.7 kPa (36.2 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>246.1 kPa (35.7 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>33.2°C (91.8°F)</td>
<td>32.8°C (91.0°F)</td>
<td>31.8°C (89.2°F)</td>
<td>30.8°C (87.4°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>19.4°C (66.9°F)</td>
<td>19.4°C (66.9°F)</td>
<td>19.4°C (66.9°F)</td>
<td>19.2°C (66.6°F)</td>
</tr>
</tbody>
</table>

SYSTEM DETECTION PHASE:

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( X )LF (   )LR (   )RR (   )RF</td>
<td>158.0 kPa (22.9 psi)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TELLTALE ILLUMINATION:

Driving in first direction:

Starting point: San Angelo Test Facility shop

Illumination in 21 seconds. Driving was not necessary.

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

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

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

DATA SHEET 3 (Sheet 16 of 22)

SCENARIO D – Left Front Tire Deflation at UVW + VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELTTALE ILLUMINATION:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>24.0°C (75.2°F)</td>
<td>Vehicle cool down period: 60 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>149.7 kPa (21.7 psi)</td>
<td>231.0 kPa (33.5 psi)</td>
<td>231.3 kPa (33.5 psi)</td>
<td>232.1 kPa (33.7 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>22.8°C (73.0°F)</td>
<td>23.2°C (73.8°F)</td>
<td>23.0°C (73.4°F)</td>
<td>23.2°C (73.8°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>19.8°C (67.6°F)</td>
<td>20.4°C (68.7°F)</td>
<td>19.8°C (67.6°F)</td>
<td>20.2°C (68.4°F)</td>
</tr>
</tbody>
</table>

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

TELLTALE EXTINGUISHMENT:

RE-ADJUSTED TIRE INFLATION PRESSURES:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After illumination verification:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
</tbody>
</table>

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

Starting point: San Angelo Test Facility shop

2:17 minutes (stopwatch time – non-cumulative) 0.5 km (0.3 mi) distance

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL) PASS

Left front tire was deflated at UVW + VCW.

REMARKS: None

RECORDED BY: Jack R. Stewart  DATE: April 21, 2009

APPROVED BY: Kenneth H. Yates
DATA SHEET 3 (Sheet 17 of 22)  
TPMS OPERATIONAL PERFORMANCE  
SCENARIO E – Right Rear, Right Front Tire Deflation at UVW + VCW

TEST DATE: ___April 21, 2009___  
LAB: U.S. DOT San Angelo Test Facility  

VEHICLE NHTSA NUMBER: ___C90505___

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

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to UVW + VCW, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>27.0°C (80.6°F)</td>
<td>27.0°C (80.6°F)</td>
<td>27.0°C (80.6°F)</td>
<td>27.0°C (80.6°F)</td>
</tr>
<tr>
<td>Vehicle cool down period:</td>
<td>62 minutes</td>
<td>62 minutes</td>
<td>62 minutes</td>
<td>62 minutes</td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>23.6°C (74.5°F)</td>
<td>24.8°C (76.6°F)</td>
<td>24.6°C (76.3°F)</td>
<td>25.4°C (77.7°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>20.6°C (69.1°F)</td>
<td>21.2°C (70.2°F)</td>
<td>21.8°C (71.2°F)</td>
<td>21.6°C (70.9°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

Time: 
Start: 16:31:39 UTC  
End: 16:56:21 UTC

Trip Odometer Reading: 
Start: 274.6 km (170.6 mi)  
End: 306.4 km (190.4 mi)

Ambient Temperature: 
Start: 27.0°C (80.6°F)  
End: 28.0°C (82.4°F)

Roadway Temperature: 
Start: 32.8°C (91.0°F)  
End: 39.8°C (103.6°F)

Driving in first direction:
Starting point: GAFB north gate  
Direction: see chart, page 67

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

Driving in opposite direction:
Starting point: US 87 crossover overpass  
Direction: see chart, page 67

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

Max speed: 98.4 km/h (61.1 mph)

Total Driving Time: 20:37 minutes (VBox time)
**DATA SHEET 3 (Sheet 18 of 22)  
TPMS OPERATIONAL PERFORMANCE  
SCENARIO E – Right Rear, Right Front Tire Deflation at UVW + VCW**

## TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Immediately, after vehicle is stopped, engine off:</strong> Inflation Pressure</td>
<td>245.3 kPa (35.6 psi)</td>
<td>250.5 kPa (36.3 psi)</td>
<td>252.0 kPa (36.5 psi)</td>
<td>245.6 kPa (35.6 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>42.0°C (107.6°F)</td>
<td>42.8°C (109.0°F)</td>
<td>42.8°C (109.0°F)</td>
<td>41.2°C (106.2°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>22.2°C (72.0°F)</td>
<td>22.2°C (72.0°F)</td>
<td>22.4°C (72.3°F)</td>
<td>22.0°C (71.6°F)</td>
</tr>
</tbody>
</table>

## SYSTEM DETECTION PHASE:

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td>( )LF ( )LR ( X )RR ( X )RF</td>
<td></td>
<td>158.0 kPa (22.9 psi)</td>
<td>158.0 kPa (22.9 psi)</td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## TELLTALE ILLUMINATION:

**Driving in first direction:**

- **Starting point:** San Angelo Test Facility shop  
- **Direction:** west  
- 1:37 minutes (stopwatch time – non-cumulative)  
- 0.2 km (0.1 mi) distance

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

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

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  
(X) YES ( ) NO (fail)
DATA SHEET 3 (Sheet 19 of 22)
TPMS OPERATIONAL PERFORMANCE
SCENARIO E – Right Rear, Right Front Tire Deflation at UVW + VCW

TIRE INFLATION Pressures And TEMPERATURES AFTER TELLTale ILLUMINATION:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>31.0°C (87.8°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle cool down period:</td>
<td>60 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>228.5 kPa (33.1 psi)</td>
<td>228.0 kPa (33.1 psi)</td>
<td>144.0 kPa (20.9 psi)</td>
<td>148.2 kPa (21.5 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>29.4°C (84.9°F)</td>
<td>29.2°C (84.6°F)</td>
<td>29.2°C (84.6°F)</td>
<td>29.0°C (84.2°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>23.4°C (74.1°F)</td>
<td>23.4°C (74.1°F)</td>
<td>23.6°C (74.5°F)</td>
<td>22.8°C (73.0°F)</td>
</tr>
</tbody>
</table>

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

TELLTale EXTINGUISHMENT:
RE-ADJUSTED TIRE INFLATION Pressures:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After illumination verification:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
</tbody>
</table>

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

Starting point:  San Angelo Test Facility shop

1:11 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

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

REMARKS:  None

RECORDED BY:  Jack R. Stewart    DATE:  April 21, 2009
APPROVED BY:  Kenneth H. Yates
TEST DATE: April 22, 2009  LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90505

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

### TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES

#### BEFORE CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to UVW + VCW, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>22.0°C (71.6°F)</td>
<td>22.0°C (71.6°F)</td>
<td>22.0°C (71.6°F)</td>
<td>22.0°C (71.6°F)</td>
</tr>
<tr>
<td>Vehicle cool down period:</td>
<td>overnight</td>
<td>overnight</td>
<td>overnight</td>
<td>overnight</td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>22.4°C (72.3°F)</td>
<td>22.4°C (72.3°F)</td>
<td>22.2°C (72.0°F)</td>
<td>22.4°C (72.3°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>22.6°C (72.7°F)</td>
<td>22.8°C (73.0°F)</td>
<td>22.8°C (73.0°F)</td>
<td>22.6°C (72.7°F)</td>
</tr>
</tbody>
</table>

#### SYSTEM CALIBRATION/LEARNING PHASE:

| Trip Odometer Reading: | Start: 310.1 km (192.7 mi) | End: 342.0 km (212.5 mi) |
| Ambient Temperature: | Start: 22.0°C (71.6°F) | End: 22.9°C (73.2°F) |
| Roadway Temperature: | Start: 20.4°C (68.7°F) | End: 24.0°C (75.2°F) |

Driving in first direction:
Starting point: GAFB north gate  Direction: see chart, page 68
10:13 minutes (stopwatch time)  15.8 km (9.8 mi) distance

Driving in opposite direction:
Starting point: US 87 crossover overpass  Direction: see chart, page 68
10:25 minutes (stopwatch time)  16.1 km (10.0 mi) distance

Max speed: 99.9 km/h (62.1 mph)
Total Driving Time: 20:38 minutes (VBox time)
**DATA SHEET 3 (Sheet 21 of 22)**  
**TPMS OPERATIONAL PERFORMANCE**  
**SCENARIO F – Left Front, Right Rear, and Right Front**  
**Tire Deflation at UVW +VCW**

### TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>243.8 kPa (35.4 psi)</td>
<td>247.6 kPa (35.9 psi)</td>
<td>248.1 kPa (36.0 psi)</td>
<td>243.5 kPa (35.3 psi)</td>
</tr>
<tr>
<td><strong>Tire Inflation Pressure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>36.4°C (97.5°F)</td>
<td>35.4°C (95.7°F)</td>
<td>32.8°C (91.0°F)</td>
<td>32.6°C (90.7°F)</td>
</tr>
<tr>
<td><strong>Tire Sidewall Temp</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>23.2°C (73.8°F)</td>
<td>23.4°C (74.1°F)</td>
<td>24.2°C (75.6°F)</td>
<td>23.4°C (74.1°F)</td>
</tr>
<tr>
<td><strong>San Angelo Test Facility Shop Floor Temp</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SYSTEM DETECTION PHASE:

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

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td>158.0 kPa (22.9 psi)</td>
<td>158.0 kPa (22.9 psi)</td>
<td>158.0 kPa (22.9 psi)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( X )LF ( )LR ( X )RR ( X )RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inflation Pressure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TELTTALE ILLUMINATION:

**Driving in first direction:**

Starting point: San Angelo Test Facility shop

Illumination in 10 seconds. Driving was not necessary.

**TELTTALE ILLUMINATES WITHIN 20 MINUTES:**  
( X )YES ( )NO (fail)

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

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  
( X )YES ( )NO (fail)
### DATA SHEET 3 (Sheet 22 of 22)
#### TPMS OPERATIONAL PERFORMANCE

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

**TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature: 25.8°C (78.4°F)</td>
<td>148.9 kPa (21.6 psi)</td>
<td>227.2 kPa (33.0 psi)</td>
<td>147.0 kPa (21.3 psi)</td>
<td>149.9 kPa (21.7 psi)</td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>25.8°C (78.4°F)</td>
<td>25.6°C (78.1°F)</td>
<td>25.6°C (78.1°F)</td>
<td>25.8°C (78.4°F)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>24.0°C (75.2°F)</td>
<td>24.2°C (75.6°F)</td>
<td>24.2°C (75.6°F)</td>
<td>24.2°C (75.6°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>24.0°C (75.2°F)</td>
<td>24.2°C (75.6°F)</td>
<td>24.2°C (75.6°F)</td>
<td>24.2°C (75.6°F)</td>
</tr>
</tbody>
</table>

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

( X )YES   (   )NO (fail)

**TELLTALE EXTINGUISHMENT:**

**RE-ADJUSTED TIRE INFLATION PRESSURES:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After illumination verification:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure: 220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td>220.0 kPa (31.9 psi)</td>
<td></td>
</tr>
<tr>
<td>San Angelo Test Facility Shop shop</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is it necessary to drive the vehicle to extinguish the telltale?  

( X )YES   (   )NO

Starting point: San Angelo Test Facility shop

0:49 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

**TEST RESULTS**

**TPMS Performance Test Results (PASS/FAIL)**

PASS

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

**REMARKS:** None

**RECORDED BY:** Todd P. Groghan  
**DATE:** April 22, 2009

**APPROVED BY:** Kenneth H. Yates
DATA SHEET 4 (Sheet 1 of 4)
Scenario G – Malfunction Detection Test at LLVW

TEST DATE: April 20, 2009  LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90505

| Time: | Start: 16:12:37 UTC | End: 16:22:02 UTC |
| Trip Odometer Reading: | Start: 210.3 km (130.7 mi) | End: 219.7 km (136.5 mi) |
| Ambient Temperature: | Start: 19.6°C (67.3°F) | End: 22.3°C (72.1°F) |
| Roadway Temperature: | Start: 27.6°C (81.7°F) | End: 39.8°C (103.6°F) |
| Fuel Level: | Start: Full |

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

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

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

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

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

Dedicated Malfunction Telltale

Driving in first direction:
Starting point: San Angelo Test Facility shop Direction: see chart , page 69
5:50 minutes (stopwatch time) 9.3 km (5.8 mi) distance

Max speed: 93.7 km/h (58.2 mph)
Total Driving Time: 5:50 minutes (VBox time)

TELLTALE ILLUMINATES WITHIN 20 MINUTES: (X) YES ( ) NO
After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X) YES ( ) NO (fail)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated for at least 60 seconds when the ignition locking system is activated to the “On” or “Run” position? (X) YES ( ) NO (fail)

Extinguishment Phase:

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

Starting point: San Angelo Test Facility shop  
1:41 minutes (stopwatch time – non-cumulative) 0.2 km (0.1 mi) distance

DEDICATED MALFUNCTION TELLLTAE EXTINGUISHED: (X) YES ( ) NO (FAIL)

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

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: April 20, 2009
APPROVED BY: Kenneth H. Yates
DATA SHEET 4 (Sheet 3 of 4)
Scenario H – Malfunction Detection Test

TEST DATE: April 21, 2009 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C90505

Time: Start: 2:35 pm End: 2:50 pm

Trip Odometer Reading: Start: 2.4 km (191.8 mi) End: 32.8 km (191.8 mi)

Ambient Temperature: Start: 33.0°C (40.8°F) End: 8.5°C (47.3°F)

Fuel Level: Start: Full

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

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

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

METHOD OF MALFUNCTION SIMULATION:
Describe method of malfunction simulation: TPMS fuse was removed.

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

Dedicated Malfunction Telltale

Driving in first direction:
Starting point: San Angelo Test Facility shop
Illumination was immediate. Driving was not necessary.

TELLTALE ILLUMINATES WITHIN 20 MINUTES: ( X )YES ( )NO
After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

( X )YES    (   )NO (fail)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated for at least 60 seconds when the ignition locking system is activated to the “On” or “Run” position?  

( X )YES    (   )NO (fail)

**Extinguishment Phase:**

Restore the TPMS to normal operation. Is it necessary to drive the vehicle to extinguish the telltale?  

( X )YES    (   )NO

**Starting point:** San Angelo Test Facility shop

Extinguishment was immediate. Driving was not necessary.

**DEDICATED MALFUNCTION TELLTEALE EXTINGUISHED:**

( X )YES    (   )NO (FAIL)

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

PASS  

TPMS fuse was removed.

**REMARKS:** None
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.”
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:

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

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

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

The above statement in the English language is provided verbatim in owner’s manual:

( ) YES  ( ) NO  ( ) N/A

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

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

The above statement in the English language is provided verbatim in owner’s manual:

(X) YES  ( ) NO

DATA INDICATES COMPLIANCE:  PASS/FAIL:  PASS
Does the Owner’s Manual provide an image of the Low Tire Pressure Warning Telltale symbol (and an image of the TPMS Malfunction Telltale warning (“TPMS”), if a dedicated telltale is utilized for this function)?

( X )YES ( )NO

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

☑ Significance of the low tire pressure warning telltale illuminating

☑ A description of corrective action to be undertaken

☑ Whether the tire pressure monitoring system functions with the vehicle’s spare tire (if provided)

☐ How to use a reset button, if one is provided

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

REMARKS: None

RECORDED BY: Todd P. Groghan DATE: April 14, 2009

APPROVED BY: Kenneth H. Yates
## SECTION 4

### TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>DESCRIPTION</th>
<th>MODEL/ SERIAL NO</th>
<th>CAL. DATE</th>
<th>NEXT CAL. DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOPWATCH</td>
<td>CHAMPION SPORTS TIMER</td>
<td>910 R N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VBOX RECORDING DEVICE</td>
<td>RACELOGIC VBOX III</td>
<td>SERIAL # 030209 3/22/2009 3/22/2010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMBIENT TEMPERATURE GAUGE</td>
<td>FLUKE 179 DIGITAL THERMOMETER</td>
<td>SERIAL #84740316 2/12/2009 2/12/2010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LASER TEMPERATURE GAUGE (TIRES AND GROUND)</td>
<td>RAYTEK ST20 SERIAL 2065640101-0014</td>
<td>8/14/2008 8/08/2009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIR PRESSURE GAUGE</td>
<td>ASHCROFT GENERAL PURPOSE DIGITAL GAUGE</td>
<td>MODEL # D1005PS 02L 100 PSI SERIAL # 20017398-01</td>
<td>11/20/2008</td>
<td>11/20/2009</td>
</tr>
<tr>
<td>FLOOR SCALES (VEHICLE)</td>
<td>INTERCOMP SW DELUXE SCALES</td>
<td>PART # 100156 SERIAL # 27032382</td>
<td>8/5/2008</td>
<td>8/5/2009</td>
</tr>
<tr>
<td>PLATFORM SCALE (BALLAST)</td>
<td>HOWE RICHARDSON</td>
<td>MODEL # 6401 SERIAL # 0181-5509-26</td>
<td>8/5/2008</td>
<td>8/5/2009</td>
</tr>
</tbody>
</table>


SECTION 5
PHOTOGRAPHS
The combined weight of occupants and cargo should never exceed 525kg or 1157 lbs.
Le poids total des occupants et des marchandises ne doit jamais dépasser 525 kg ou 1157 lbs.

<table>
<thead>
<tr>
<th>TIRE/ PNEU</th>
<th>SIZE / DIMENSIONS</th>
<th>COLD TIRE PRESSURE / PRESSION DES PNEUS À FROID</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRONT/ AVANT</td>
<td>P205/60R16</td>
<td>220kPa, 32psi</td>
</tr>
<tr>
<td>REAR/ ARRIÈRE</td>
<td>P205/60R16</td>
<td>220kPa, 32psi</td>
</tr>
<tr>
<td>SPARE/ DE RECHANGE</td>
<td>T125/80D16</td>
<td>420kPa, 60psi</td>
</tr>
</tbody>
</table>

See owner's manual for additional information
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138

FIGURE 5.4
TIRE SHOWING BRAND
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138

FIGURE 5.6
TIRE SHOWING SIZE AND LOAD INDEX / SPEED RATING
Figure 5.7
Tire showing DOT serial number

2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138

FIGURE 5.8
TIRED SHOWING MAX LOAD RATING AND MAX COLD INFLATION PRESSURE
TREAD PLIES: 1 POLYESTER
+2 STEEL + 1 POLYAMIDE
SIDEWALL PLY: 1 POLYESTER

DIFFERENT TIRE SIZES ON THE SAME AXLE.
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138

FIGURE 5.10
TPMS SENSOR
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138

FIGURE 5.11
RIM CONTOUR FOR FULL WIDTH OF CROSS SECTION
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138

FIGURE 5.12
DISPLAY SHOWING LOW TIRE PRESSURE WARNING TELLTALE
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO 138

FIGURE 5.14
TEST INSTRUMENTATION INSTALLED IN VEHICLE
FIGURE 5.15
VEHICLE MID SEAT BALLAST
FOR UVW + VCW LOAD
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138

FIGURE 5.16
VEHICLE REAR SEAT BALLAST FOR UVW + VCW LOAD
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138

FIGURE 5.17
VEHICLE CARGO AREA BALLAST FOR UVW + VCW LOAD
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138

FIGURE 5.18
VEHICLE ON WEIGHT SCALES
2009 KIA RONDO
NHTSA NO. C90505
FMVSS NO. 138

FIGURE 5.19
SPARE INSTALLED ON RIGHT FRONT
FOR MALFUNCTION DETECTION TEST
FIGURE 5.20
TPMS FUSE REMOVED FOR MALFUNCTION DETECTION TEST
SECTION 6
TEST PLOTS
Scenario A: Right Rear Tire at LLVW
Test Date: 4/16/09
Data File Time: 24:59 minutes
Cumulative Driving Time: 20:39 minutes
Start Point: GAFB North Gate

Calibration Phase:

RR Detection Phase: Illumination occurred in 1:20 minutes. Driving above 50 km/h was not necessary.
Scenario B: Left Rear, Right Front Tires at LLVW
Test Date: 4/17/09
Data File Time: 24:35 minutes
Cumulative Driving Time: 20:37 minutes
Start Point: GAFB North Gate

Calibration Phase:

LR, RF Detection Phase: Illumination occurred in 1:20 minutes. Driving above 50 km/h was not necessary.
Scenario C: Left Front, Left Rear, Right Rear, Right Front Tires at LLVW
Test Date: 4/20/09
Data File Time: 24:26 minutes
Cumulative Driving Time: 20:42 minutes
Start Point: GAFB North Gate

Calibration Phase:

LF, LR, RR, RF Detection Phase: Illumination occurred immediately after lamp check. Driving above 50 km/h was not necessary.
Scenario D: Left Front Tire at UVW + VCW
Test Date: 4/21/09
Data File Time: 24:43 minutes
Cumulative Driving Time: 20:37 minutes
Start Point: GAFB North Gate

Calibration Phase:

LF Detection Phase: Illumination occurred in 21 seconds. Driving above 50 km/h was not necessary.
Scenario E: Right Rear, Right Front Tires at UVW + VCW
Test Date: 4/21/09
Data File Time: 24:51 minutes
Cumulative Driving Time: 20:37 minutes
Start Point: GAFB North Gate

Calibration Phase:

2009 Kia Rondo (C90505) RR, RF Calibration UVW+VCW

Log Rate := 100.00 Hz

RR, RF Detection Phase: Illumination occurred in 1:37 minutes. Driving above 50 km/h was not necessary.
Scenario F: Left Front, Right Rear, Right Front Tires at U VW + VCW
Test Date: 4/21/09
Data File Time: 24:51 minutes
Cumulative Driving Time: 20:38 minutes
Start Point: GAFB North Gate

Calibration Phase:

LF, RR, RF Detection Phase: Illumination occurred in 1:37 minutes. Driving above 50 km/h was not necessary.
Scenario G Malfunction Illumination: Spare Tire without TPMS Sensor Applied to Right Front at LLVW
Test Date: 4/20/09
Data File Time: 9:25 minutes
Cumulative Driving Time: 5:50 minutes
Start Point: San Angelo Test Facility shop
SECTION 7
OWNER’S MANUAL PAGES
TIRES PRESSURE MONITORING SYSTEM (TPMS) (IF EQUIPPED)

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

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

Your vehicle has also been equipped with a TPMS malfunction indicator to indicate when the system is not operating properly. The TPMS malfunction indicator is provided by a separate telltale, which displays the symbol "TPMS" when illuminated. 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.

(1) Low tire pressure telltale
(2) TPMS malfunction indicator

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 inflation pressure for those tires.)
What to do in an emergency

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**Low tire pressure telltale**

When the tire pressure monitoring system warning telltale is illuminated, one or more of your tires is significantly under-inflated.

Immediately reduce your speed, avoid hard cornering and anticipate increased stopping distances. You should stop and check your tires as soon as possible. Inflate the tires to the proper pressure as indicated on the vehicle's placard or tire inflation pressure label located on the driver's side center pillar outer panel. If you cannot reach a service station or if the tire cannot hold the newly added air, replace the low pressure tire with the compact spare tire. Because the compact spare tire is not equipped with a tire pressure sensor, the TPMS malfunction indicator may go on and the Low tire pressure telltale still turn on after restarting and about 20 minutes of continuous driving before you have the low-pressure tire repaired and replaced on the vehicle.

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**CAUTION**

In winter or cold weather, the low tire pressure telltale may be illuminated if the tire pressure was adjusted to the recommended tire inflation pressure in warm weather. It does not mean your TPMS is malfunctioning because the decreased temperature leads to a proportional lowering of tire pressure.

When you drive your vehicle from a warm area to a cold area or from a cold area to a warm area, or the outside temperature is greatly higher or lower, you should check the tire inflation pressure and adjust the tires to the recommended tire inflation pressure.

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**WARNING - Low pressure damage**

Significantly low tire pressure makes the vehicle unstable and can contribute to loss of vehicle control and increased braking distances.

Continued driving on low pressure tires will cause the tires to overheat and fail.
TPMS (Tire Pressure Monitoring System) malfunction indicator

The TPMS malfunction indicator comes on and stays on when there is a problem with the Tire Pressure Monitoring System. If the system is able to correctly detect an under-inflation warning at the same time as system failure then it will illuminate both the TPMS malfunction and the low tire pressure telltale e.g. if Front Left sensor fails, the TPMS malfunction indicator comes on, but if Front Right, Rear Left, or Rear Right tire is under-inflated, the low tire pressure indicator may come on with the TPMS malfunction indicator.

Have the system checked by an authorized KIA dealer as soon as possible to determine the cause of the problem.

⚠️ CAUTION
- The TPMS malfunction indicator may be illuminated if the vehicle is moving around electric power supply cable or radio transmitter such as police stations, government and public offices, broadcasting stations, military installations, airports, or transmitting tower, etc. which can interfere with normal operation of the Tire Pressure Monitoring System (TPMS).
- The TPMS malfunction indicator may be illuminated if snow chains or some electronic devices, such as notebook computers, are used in the vehicle. This can interfere with normal operation of the Tire Pressure Monitoring System (TPMS).

Changing a tire with TPMS

If you have a flat tire, the Low Tire Pressure telltale will turn on. Have the flat tire repaired by an authorized KIA dealer as soon as possible or replace the flat tire with the compact spare tire.

⚠️ CAUTION
NEVER use a puncture-repairing agent to repair and/or inflate a low pressure tire. If used, you will have to replace the tire pressure sensor.

Each wheel is equipped with a tire pressure sensor mounted inside the tire behind the valve stem. You must use TPMS specific wheels. It is recommended that you always have your tires serviced by an authorized KIA dealer as soon as possible.
What to do in an emergency

After you replace the low pressure tire with the compact spare tire, the TPMS malfunction indicator may illuminate and the low tire pressure telltale still illuminate after restarting and about 20 minutes of continuous driving.

Once the low pressure tire is re-inflated to the recommended pressure and installed on the vehicle, the TPMS malfunction indicator and the low tire pressure telltale will be extinguished. If the low pressure and TPMS malfunction indicators are not extinguished after about 20 minutes of continuous driving, please visit an authorized KIA dealer.

You may not be able to identify a low tire by simply looking at it. Always use a good quality tire pressure gauge to measure the tire's inflation pressure. Please note that a tire that is hot (from being driven) will have a higher pressure measurement than a tire that is cold (from sitting stationary for at least 3 hours and driven less than 1 mile (1.6 km) during that 3 hour period). Allow the tire to cool before measuring the inflation pressure.

Always be sure the tire is cold before inflating to the recommended pressure.

A cold tire means the vehicle has been sitting for 3 hours and driven for less than 1 mile (1.6 km) in that 3 hour period.

⚠️ CAUTION
- Do not use any tire sealant if your vehicle is equipped with a Tire Pressure Monitoring System. The liquid sealant can damage the tire pressure sensors.
- In order for the system to correctly monitor tires for under-inflation, there should be a total of exactly 4 sensors fitted to each of the four driven wheel positions. There should be no other sensors in the vehicle including spare tire since this could cause the system to monitor the wrong sensors.

⚠️ WARNING - TPMS
- The TPMS cannot alert you to severe and sudden tire damage caused by external factors such as nails or road debris.
- If you feel any vehicle instability, immediately take your foot off the accelerator, apply the brakes gradually and with light force, and slowly move to a safe position off the road.
What to do in an emergency

WARNING - Protecting TPMS
Tampering with, modifying, or disabling the Tire Pressure Monitoring System (TPMS) components may interfere with the system's ability to warn the driver of low tire pressure conditions and/or TPMS malfunctions. Tampering with, modifying, or disabling the Tire Pressure Monitoring System (TPMS) components may void the warranty for that portion of the vehicle.

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.

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