This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By: Debbie Messick
Approved By: Grant Farrand
Approval Date: ________________

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: ___________________
Acceptance Date: ________________
## 4. Title and Subtitle
FMVSS NO. 202a – Head Restraints
Nissan Motor Co. LTD, 2005 Nissan Altima, Passenger Car
NHTSA No. C55201

## 5. Report Date
May 9, 2006

## 6. Performing Organ. Code
GTL

## 7. Author(s)
Grant Farrand, Project Engineer
Debbie Messick, Project Manager

## 9. Performing Organization Name and Address
General Testing Laboratories, Inc.
1623 Leedstown Road
Colonial Beach, Va 22443

## 12. Sponsoring Agency Name and Address
U.S. Department of Transportation
Safety Enforcement
Office of Vehicle Safety Compliance (NVS-220)
400 7th Street, S.W., Room 6115
Washington, DC 20590

## 13. Type of Report and Period Covered
Final Test Report
February 28-March 1, 2006

## 15. Supplementary Notes

## 16. Abstract
Tests were conducted on the subject, 2005 Nissan Altima passenger car in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-202aS-00. This was an indicant test for FMVSS 202 compliance. The results indicate that the 2005 Nissan Altima meets the requirements of FMVSS 202.

## 17. Key Words
Safety Engineering
FMVSS 202a
Head Restraints

## 20. Security Classif. (of this page)
UNCLASSIFIED

Form DOT F 1700.7 (8-72)
<table>
<thead>
<tr>
<th>SECTION</th>
<th>CONTENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Purpose of Test</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Test Procedure</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Results and Test Data</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Test Equipment List</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>Photographs</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>Test Plots</td>
<td>38</td>
</tr>
</tbody>
</table>
SECTION 1

PURPOSE OF TEST

1.0 PURPOSE OF TEST

A 2005 Nissan Altima passenger car was subjected to Position Retention Tests in Federal Motor Vehicle Safety Standard (FMVSS) No. 202a to determine the effect of test procedure variations. The purpose of this standard is to establish requirements for head restraints to reduce the frequency and severity of neck injury in rear end and other collisions.

1.1 The test vehicle was a 2005 Nissan Altima passenger car. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 1N4AL11D25C172044

B. NHTSA No.: C55201

C. Manufacturer: NISSAN MOTOR CO., LTD.

D. Manufacture Date: 04/04

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 202a testing during the time period February 28 –March 1, 2006.
2.0 TEST PROCEDURE

All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Procedures, TP-202As-00 dated 22 December 2004.

NOTE:
1. The Backset Retention maximum loading to 885 newtons was not performed at this time.
2. The Head Impact Energy Absorption test was not performed at this time.
SECTION 3

RESULTS AND TEST DATA

3.0 RESULTS AND TEST DATA

The following data sheets document the results of testing on the 2005 Nissan Altima.
DATA SHEET 1
HEIGHT RETENTION TEST
(ADJUSTABLE HEAD RETRAINTS ONLY)

VEHICLE: 2005 NISSAN ALTIMA, PASSENGER CAR

VEH. NHTSA NO.: C55201 TEST DATE: 02/28/06

TEST #5395

Seat Location: Driver

Pre-test measurements

HEAD RESTRAINT IN POSITION 5 (0-5)

SAE J826 Manikin torso angle:
Top of Head Restraint Height (mm): 791 mm

Striker to H-Point (mm): Striker to H-Point angle:

DESCRIPTION OF HEIGHT RETENTION LOCK: The head restraint has two mounting posts. The left side post has detents cut into it which engage into a lock mechanism which prevents downward movement of the head restraint in each position. Only the full up position locks in the upward direction to prevent headrest removal. The right side post has no locking detents.

Test measurements

Initial load (50 N ± 1 N): 52 N Initial Displacement, D1 (mm): 12.5 mm

Initial Displacement (D1) < 25 mm PASS X FAIL ______

Maximum load (495 N ± 5 N): 500 N Maximum Displacement, D2 (mm): 40.0 mm

Return load (50 N ± 1 N): 52 N Return Displacement, D3 (mm): 27.0 mm

Total displacement (D3-D1) < 13 mm: 14.5 mm PASS _____ X FAIL ______

REMARKS:

RECORDED BY: G. Farrand DATE: 02/28/06

APPROVED BY: D. Messick
DATA SHEET 2
BACKSET RETENTION TEST

VEHICLE: 2005 NISSAN ALTIMA, PASSENGER CAR
VEH. NHTSA NO.: C55201 TEST DATE: 03/01/06

TEST #5409
Seat Location: Driver Type of head restraint:

Pre-test measurements

SAE J826 Manikin torso angle: Top of Head Restraint Height (mm): 791 mm FULL UP
Striker to H-Point (mm): Striker to H-Point angle:

Displacement torso reference line

Test device back pan angle: Pre-Test 19.1°; Full Load 33.7°

Distance from the H-point to the initial location of the load (0.290 ± 0.013 m): .290 m
Initial load (N): 1286 N Initial moment (373 ± 7.5 Nm): 373 Nm

Backset retention and strength
Zero Displacement set at torso reference line.

Distance from the H-point to the head form tangency point (m): .726 m
Zero Contact Ref. 63.3 mm
Initial load (N): 54 N Initial moment (37 ± 0.7 Nm): 39 Nm
Initial displacement: -40.7 mm
Initial head form displacement, D1 (< or = 25 mm): -22.6 mm PASS X FAIL

Load range to generate a 373 ± 7.5 Nm rearward moment (N): 375 N
Actual load applied (N): 516 N Resultant moment (Nm): 375 Nm
Actual displacement: 98.3 mm
Maximum Head form displacement, D2 (< or = 102 mm): 98.3 mm PASS X FAIL

Final Load (N): 54 N
Final head form displacement, D3 (mm): 0.0 mm Measured at (37± 0.7 Nm) 39 Nm

Total displacement (D3-D1) < 13 mm : 40.7 mm PASS X FAIL

Maximum applied load (> or equal to 885 N): N/A PASS X FAIL

REMARKS:

RECORDED BY: G. Farrand DATE: 03/02/06
APPROVED BY: D. Messick
## DATA SHEET 3

### VEHICLE INFORMATION

<table>
<thead>
<tr>
<th>Year:</th>
<th>2005</th>
<th>Make:</th>
<th>Nissan</th>
<th>VIN:</th>
<th>1N4AL11D25C172044</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td></td>
<td>Model:</td>
<td>Altima</td>
<td>NHTSA No:</td>
<td>C55201</td>
</tr>
</tbody>
</table>

### OCCUPANT LOCATION P1

| 1. Seat Fore/Aft | 10.5 degree from vertical of head restraint post |
| 2. Seat Raise/Lower | 728 distance (mm) from visor bolt to head restraint post center |
| 3. Seat Tilt | |
| 4. Seat Cushion | |
| 5. Seat Back Adjustment with manikin installed (25 deg. target torso angle) | 10.5 degree from vertical of head restraint post |
| | 728 distance (mm) from visor bolt to head restraint post center |
| 6. Seat Back Adjustment without manikin | 10.6 degree from vertical of head restraint post |
| | 726 distance (mm) from visor bolt to head restraint post center |
| | 4 detents with full up locked being 0 |

NOTE: LUMBAR SUPPORT SHOULD BE RETRACTED

### H-POINT LOCATION (mm)*

| X (forward of striker) | 103 |
| Z (below striker)      | 127 |

### TORSO ANGLE (deg)

| LEFT | 21.0 |
| RIGHT | |

### VEHICLE SILL ANGLE (deg)

| CURB WEIGHT PLUS SAE J826 MANIKIN | |

### HEAD RESTRAINT HEIGHT (mm)

<table>
<thead>
<tr>
<th>LOWEST</th>
<th>SAE J826 MANIKIN HEAD ROOM PROBE (DIMENSION HAS BEEN OFFSET 101.6 MM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position 0</td>
<td>722.0</td>
</tr>
<tr>
<td>Position 1</td>
<td>735.0</td>
</tr>
<tr>
<td>Position 2</td>
<td>753.0</td>
</tr>
<tr>
<td>Position 3</td>
<td>765.0</td>
</tr>
<tr>
<td>Position 4</td>
<td>783.0</td>
</tr>
<tr>
<td>Position 5</td>
<td>791.0</td>
</tr>
<tr>
<td>Position 6</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### HIGHEST

*SAE J826 H-POINT TARGET REFERENCED TO THE VEHICLE STRIKER*
### DATA SHEET 4

#### VEHICLE INFORMATION

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>Make</th>
<th>Nissan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td></td>
<td>VIN</td>
<td>1N4AL11D25C172044</td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td>NHTSA No</td>
<td>C55201</td>
</tr>
</tbody>
</table>

#### SEAT SETUP

<table>
<thead>
<tr>
<th>OCCUPANT LOCATION P1</th>
<th>GTL</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Seat Fore/Aft</td>
<td>Full Rear</td>
</tr>
<tr>
<td>8. Seat Raise/Lower</td>
<td></td>
</tr>
<tr>
<td>9. Seat Tilt</td>
<td></td>
</tr>
<tr>
<td>10. Seat Cushion</td>
<td></td>
</tr>
</tbody>
</table>
| 11. Seat Back Adjustment with manikin installed (25 deg. target torso angle) | 15.6 degree from vertical of head restraint post  
|                      | 784 distance (mm) from visor bolt to head restraint post center      |
| 12. Seat Back Adjustment without manikin | 15.7 degree from vertical of head restraint post  
|                      | 782 distance (mm) from visor bolt to head restraint post center      |
|                      | 5 detents with full up locked being 0                                |

**NOTE:** LUMBAR SUPPORT SHOULD BE RETRACTED

#### H-POINT LOCATION (mm)*

<table>
<thead>
<tr>
<th>X (forward of striker)</th>
<th>101</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z (below striker)</td>
<td>149</td>
</tr>
</tbody>
</table>

#### TORSO ANGLE (deg)

| 23.0 |

#### VEHICLE SILL ANGLE (deg)

| LEFT  |
|       |
|       |

#### HEAD RESTRAINT HEIGHT (mm)

**LOWEST**

| SAE J826 manikin head room probe (dimension has been offset 101.6 mm) |
|---------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Position 0                | 755.0           | 768.0           | 783.0           | 798.0           | 811.0           | 821.0           | N/A             |
| Position 1                |                 |                 |                 |                 |                 |                 |                 |
| Position 2                |                 |                 |                 |                 |                 |                 |                 |
| Position 3                |                 |                 |                 |                 |                 |                 |                 |
| Position 4                |                 |                 |                 |                 |                 |                 |                 |
| Position 5                |                 |                 |                 |                 |                 |                 |                 |
| Position 6                |                 |                 |                 |                 |                 |                 |                 |

**HIGHEST**

| SAE J826 H-POINT TARGET REFERENCED TO THE VEHICLE STRIKER

---

*SAE J826 H-POINT TARGET REFERENCED TO THE VEHICLE STRIKER
# TABLE 1 – INSTRUMENTATION & EQUIPMENT LIST

<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>HRMD RONA KINETICS &amp; ASSOCIATES LTD.</td>
<td>HRMD 0-62</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>J826 MANIKIN ALDERSON RESEARCH LABS</td>
<td>3 DM/92</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>DIGITAL PROTRACTOR MITUTOYO</td>
<td>950-315 PRO 360</td>
<td>BEFORE USE</td>
<td>BEFORE USE</td>
<td></td>
</tr>
<tr>
<td>RULE/SCALE STARRET</td>
<td>C331</td>
<td>05/05</td>
<td>05/06</td>
<td></td>
</tr>
<tr>
<td>TORPEDO LEVEL SANDS</td>
<td>500</td>
<td>BEFORE USE</td>
<td>BEFORE USE</td>
<td></td>
</tr>
<tr>
<td>FORCE GAUGE CHATILLON</td>
<td>DPPN-50 870</td>
<td>BEFORE USE</td>
<td>BEFORE USE</td>
<td></td>
</tr>
<tr>
<td>CALIPER STARRET</td>
<td>N/A</td>
<td>BEFORE USE</td>
<td>BEFORE USE</td>
<td></td>
</tr>
<tr>
<td>LEVEL, LASER BLACK &amp; DECKER</td>
<td>360</td>
<td>BEFORE USE</td>
<td>BEFORE USE</td>
<td></td>
</tr>
<tr>
<td>LEVEL, LASER SEAN &amp; STEPHEN CORP</td>
<td>90º, 45º</td>
<td>BEFORE USE</td>
<td>BEFORE USE</td>
<td></td>
</tr>
<tr>
<td>LEVEL, LASER GAERTNER</td>
<td>2789-A</td>
<td>BEFORE USE</td>
<td>BEFORE USE</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 5
PHOTOGRAPHS
FIGURE 5.1
LEFT SIDE VIEW OF VEHICLE
2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.2
RIGHT SIDE VIEW OF VEHICLE
2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.3
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE
2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.4
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE
MANUFACTURED BY NISSAN MOTOR CO., LTD.

DATE  04/04  GVWR   4202 LB
GAWR FR. 2249 LB  GAWR RR. 1969 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR
VEHICLE SAFETY, BUMPER AND THEFT PREVENTION STANDARDS
IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.
SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION.

VIN: 1N4AL11D25C172044 PASSenger Car
COLOR  TRIM  TRANS  AXLE  ENGINE
KY2   G   RE4F048  FT44  QR25DE 2488cc
MODEL:  BDBALBA-EUA

2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.5
VEHICLE CERTIFICATION LABEL
**Figure 5.6**

**Vehicle Tire Information Label**

<table>
<thead>
<tr>
<th>Vehicle Capacity Weight</th>
<th>POIDS UTILE DU VEHICULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>860 lbs</td>
<td>390 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seating Capacity</th>
<th>NOMBRE DE PLACES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tire Size Dimensions</th>
<th>FRONT AVANT (psi)</th>
<th>REAR ARRIERE (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P215/60R16 94T</td>
<td>29 (200)</td>
<td>29 (200)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spare Tire Roue de Secours</th>
<th>psi (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T135/90R16</td>
<td>60 (420)</td>
</tr>
</tbody>
</table>

**Recommended Cold Tire Inflation Pressure**

Pression de gonflage recommandée des pneus froids.

Do not use in excess of 50 mph, 80 km/h.

See owner’s manual for additional information.

Utilisation à une vitesse max 50 mph, 80 km/h.

Pour les détails se réferer au manuel du conducteur.
FIGURE 5.7
VEHICLE PRE-TEST SET-UP
2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.8
PRE-TEST, HEIGHT RETENTION, DRIVER #1
FIGURE 5.10
CONTACT, HEIGHT RETENTION, DRIVER #1
FIGURE 5.11
FULL LOAD, HEIGHT RETENTION, DRIVER #1
2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.14
PRE-TEST BACK PAN, DRIVER #1
2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.16
PRE-TEST, BACKSET RETENTION, DRIVER #1
2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.17
CONTACT, BACKSET RETENTION, DRIVER #1
2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.18
ACTIVE HEAD RESTRAINT SPRING AT CONTACT
FIGURE 5.19
FULL LOAD BACKSET RETENTION, DRIVER #1
2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.20
FULL LOAD, BACKSET RETENTION, DRIVER #1
FIGURE 5.22
POST TEST BACKSET RETENTION, DRIVER #1
2005 NISSAN ALTIMA
NHTSA NO. C55201
FMVSS NO. 202a

FIGURE 5.23
POST TEST, BACKSET RETENTION, DRIVER #1
¾ VIEW OF UNOCCUPIED DRIVER SEAT, ITERATION 1
SECTION 6
TEST PLOTS
GTL 5395
202, Head Restraint Retention, Vertical

Displacement in Millimeters

Time in Seconds
GTL 5409

202, Head Restraint Retention, Back Pan.

Time in Seconds

Force in Newtons/Displacement in Mm/10 Thousands