

REPORT NUMBER: TR-P35007-08-NC

**SIDE AIRBAG OCCUPANT RISK PROGRAM
OCCUPANT OUT-OF-POSITION TESTS**

**NISSAN MOTOR CO., LTD.
2015 NISSAN ALTIMA 2.5 S
4-DOOR SEDAN**

NHTSA NUMBER: M20155201TWG2

**PREPARED BY:
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SEPTEMBER 29, 2015

FINAL REPORT

**PREPARED FOR:
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This final test report was prepared for the U.S. Department of Transportation, Alpha Technology Associate, Inc., in response to Contract Number DTNH22-12-D-00259.

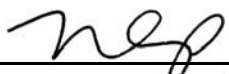
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This occupant out-of-position static side airbag deployment test is part of the Technical Working Group Occupant Injury Risk from Deploying Side Airbags Testing Program sponsored by Alpha Technology Associate, Inc. under Contract No. DTNH22-12-D-00259. The purpose of this test was to obtain occupant injury data for a side airbag deployment.

The occupant out-of-position (OOP) side airbag test was conducted in accordance with the Technical Working Group Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags.

SUMMARY

The effects of a roof mounted curtain airbag and a seat mounted torso/pelvis airbag deployment in a 2015 Nissan Altima 2.5 S 4-door sedan with an out-of-position Part 572V (SID-IIs) dummy were evaluated. The test was performed at KARCO Engineering, LLC. on September 16, 2015. Pre- and post-test photographs of the vehicle and dummy can be found in Appendix A.

Three (3) high-speed digital cameras and one (1) real time camera were used to document the deployment of the airbags. Camera locations and other pertinent camera information can be found on Data Sheet No.1 and Data Sheet No.6.

A SID-IIs anthropomorphic test device (ATD) was placed in the right front passenger seating position facing forward inboard according to the dummy placement instructions (3.3.5.2) in the July 2003 Revision of the Technical Working Group's 'Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags'.

The SID-IIs ATD was instrumented with head tri-axial accelerometers, upper and lower neck force transducers.

The airbags were deployed and fifteen (15) channels of data were recorded using a data acquisition system. Appendix B contains dummy response data traces. Appendix C contains the instrumentation data channel assignments. Appendix D contains ATD calibration sheets.

Orientation of the SID-IIs dummy was with the dummy facing toward the front of the vehicle with its arm against the door panel. The seat is adjusted to its highest position and the seat track is adjusted forward to minimize the vertical distance between the dummy's head and the roof-rail module and to maximize the cushion to head interaction. The dummy's pelvis is slid outboard until the dummy contacts the door trim panel or armrest and the CG of the head is centered in the deployment trajectory of the airbag. This orientation complies with section 3.3.5.2 of the Technical Working Group (TWG) recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags.

The passenger side door remained closed during the test, and was operable after the airbag deployed.

The SID-IIs dummy's visible contact points were as follows: The ATD's head contacted the curtain airbag. The ATD's abdomen and right arm contacted the torso/pelvis airbag. The ATD's chest contacted the torso/pelvis airbag and the curtain airbag.

The occupant data is summarized below:

Measurement Description	Units	Passenger ATD (SID-IIs)	
		IARV	Result
Head Injury Criteria (HIC15)	N/A	779	4.1
Upper Neck Nij	N/A	1	0.28
Upper Neck Peak Tension	Newtons (N)	2070	386.4
Upper Neck Peak Compression	Newtons (N)	2520	-799.2

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No.: M20155201TWG2
Test Program: TWG 3.3.5.2 Test Date: 09/16/15

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lbf/in ²	kPa	6.895
Temperature	General Use	°F	°C	$=(T_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf-ft	N•m	1.355

DATA SHEET NO. 1**TEST SUMMARY**

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No.: M20155201TWG2
Test Program: TWG 3.3.5.2 Test Date: 09/16/15

TEST DUMMY INFORMATION

Description	Passenger Seat
Dummy Type / Serial No.	SID-IIs / 294
Head Contact	Curtain Airbag
Chest Contact	Torso/Pelvis Airbag, Curtain Airbag
Abdomen Contact	Torso/Pelvis Airbag
Pelvis Contact	None
Left Knee Contact	None
Right Knee Contact	None

VIDEO COVERAGE

Description	Quantity
High Speed Digital	3
Real Time	1
Total	4

DATA CHANNELS

Description	Quantity
Head Accelerometers	3
Upper Neck Transducers	6
Lower Neck Transducers	6
Total	15

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No.: M20155201TWG2
 Test Program: TWG 3.3.5.2 Test Date: 09/16/15

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20155201TWG2
Model Year	2015
Make	Nissan
Model	Altima 2.5 S
Body Style	4-Door Sedan
VIN	1N4AL3AP0FN304343
Body Color	Cayenne Red
Odometer Reading (km / mi)	216 / 134
Engine Displacement (L)	2.5
Type / No. of Cylinders	Inline 4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	CVT
Overdrive	Yes
Final Drive	Front
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

Traction Control System	Yes
Power Steering	Yes
Power Window Auto-Reverse	Yes
Driver Frontal Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	No
Front Pass. Torso/Pelvis Airbag	Yes
Front Pass. Pelvis Airbag	No
Front Pass. Knee Airbag	No
Driver Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Front Pass. Seat Belt Pretensioner	Yes
Front Pass. Load Limiter	Yes
Front Pass. Active Glove Box	No

Does Owner's Manual provide instructions to turn off automatic door locks?

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co., LTD.
Date of Manufacture	May-15

GVWR (kg)	1910
GAWR Front (kg)	1005
GAWR Rear (kg)	940

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

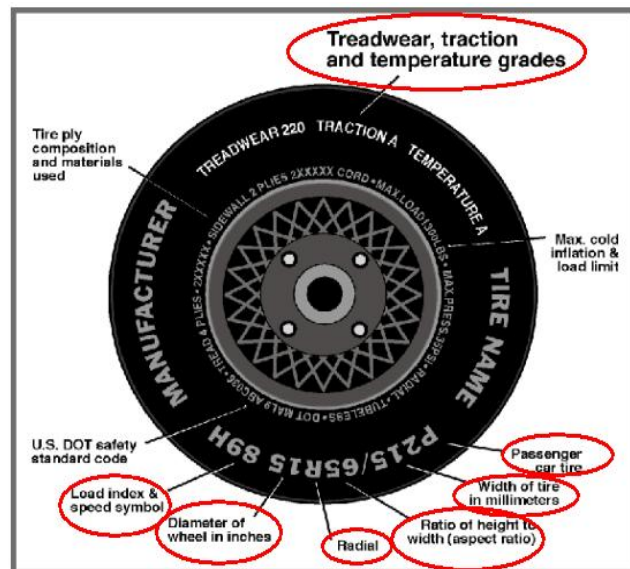
Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Bench			
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				408.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				67.8	A-B

*Vehicle underwent New Car Assessment Program Side MDB Impact Testing on September 11, 2014.

DATA SHEET NO. 2 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No.: M20155201TWG2
 Test Program: TWG 3.3.5.2 Test Date: 09/16/15



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	220	220
Recommended Tire Size	P215/60R16	P215/60R16
Tire Size on Vehicle	P215/60R16	P215/60R16
Tire Manufacturer	Hankook	Hankook
Tire Model	Optimo	Optimo
Treadwear	640	640
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	2 Steel, 1 Polyester, 1 Nylon	2 Steel, 1 Polyester, 1 Nylon
Load Index / Speed Symbol	94T	94T
Tire Material	Steel, Polyester, Nylon	Steel, Polyester, Nylon
DOT Safety Code Left	T7UP DLH 5013	T7UP DLH 5013
DOT Safety Code Right	T7UP DLH 5013	T7UP DLH 5013

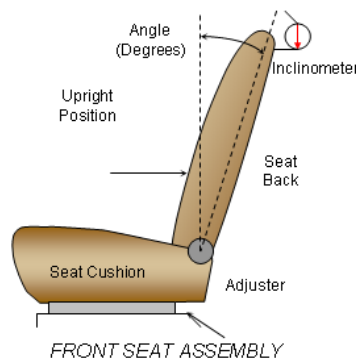
DATA SHEET NO. 3

SEAT ADJUSTMENTS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No.: M20155201TWG2
 Test Program: TWG 3.3.5.2 Test Date: 09/16/15

SEAT BACK ANGLE

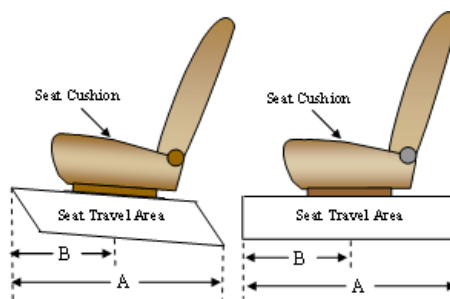
The passenger seat back is positioned per section 3.3.5.2 of the TWG recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags. Seat back angle is measured at the head rest post.



Seating Position	Degrees
Passenger Seat	6.5

SEAT FORE / AFT POSITIONING

The passenger seat track travel is set per section 3.3.5.2 of the TWG recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags. The first or forward most position is counted as zero (0)



Seating Position	Total Fore-Aft Travel		Placed in Position	
	mm	Detents	mm	Detents
Passenger Seat	240	25	50	5

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the uppermost position. Position "H" is the uppermost position, followed by position "M1". Position "L" is the lowermost position.

Seating Position	Total No. of Positions	Placed in Position
Passenger Seat	Fixed	Fixed *

DATA SHEET NO. 4**DUMMY POSITIONING AND AIRBAG DIMENSIONS**

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No.: M20155201TWG2
 Test Program: TWG 3.3.5.2 Test Date: 09/16/15

DUMMY POSITIONING

Code	Measurement Description	Passenger	
		Length (mm)	Angle (°)
SA	Seat Back Angle		6.5
AN	Top of Airbag Module to Head/Neck Junction	325	90.0
HD	Head CG to Door Panel/ Window	122	0.0
HSC	Head to Seat Back Centerline	173	0.0
HB	Head to B-Pillar (first contact)	87	0.0
HZ	Head to Roof (Z)	202	90.0
HHD	Head to Header (measured from back of head)	396	71.0
ND	Nose to Dash (measured from back of head)	609	22.1
NS	Nose to Seat Back	276	0.0
NR	Nose to Header (measured from back of head)	385	36.2
CD	Chest to Dash (measured from back)	522	9.0
CS	Chest to Seat Back	255	0.0
RACL	Right Arm to Seat Back Centerline	285	0.0
LACL	Left Arm to Seat Back Centerline	N/A	N/A
RA	Right Arm to Door Panel	0	0.0
LA	Left Arm to Door Panel	N/A	N/A
KK	Knee to Knee	140	0.0
TT	Toe to Toe	115	0.0
KSCR	Right Knee to Seat Cushion Centerline	135	0.0
KSCL	Left Knee to Seat Cushion Centerline	0	0.0
	Head Level (X Direction)		17.9
	Head Level (Y Direction)		13.2

AIRBAG DIMENSIONS

Code	Measurement Description	Airbag
		Length (mm)
AMW	Curtain Airbag Module Diameter	35
AML	Curtain Airbag Module Length	300
ABW	Curtain Airbag Width	565
ABL	Curtain Airbag Length	1772
AMW	Torso/Pelvis Airbag Module Diameter	23
AML	Torso/Pelvis Airbag Module Length	138
ABW	Torso/Pelvis Airbag Width	378
ABL	Torso/Pelvis Airbag Length	696

DATA SHEET NO. 5

DUMMY INJURY CRITERIA AND PERFORMANCE VALUES

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No.: M20155201TWG2
 Test Program: TWG 3.3.5.2 Test Date: 09/16/15

HEAD PEAK ACCELERATIONS

Location	Axis	Units	SID-IIs			
			Max	Time	Min	Time
Head CG	X	G's	4.5	13.6	-12.8	27.9
Head CG	Y	G's	20.5	14.1	-5.8	20.8
Head CG	Z	G's	24.4	14.2	-5.9	28.3
Head CG Resultant	N/A	G's	31.8	14.2		

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	SID-IIs			
			Max	Time	Min	Time
Neck Force	X	Newtons	360.2	27.3	-52.0	128.1
Neck Force	Y	Newtons	12.9	300.0	-286.8	57.0
Neck Force	Z	Newtons	386.4	29.9	-799.2	16.0
Neck Force Resultant	N/A	Newtons	868.9	16.1		
Neck Moment	X	Nm	24.3	16.9	-10.1	40.9
Neck Moment	Y	Nm	30.2	24.2	-7.8	39.9
Neck Moment	Z	Nm	2.5	300.0	-11.3	70.5
Neck Moment Resultant	N/A	Nm	31.2	24.2		

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	SID-IIs			
			Max	Time	Min	Time
Neck Force	X	Newtons	495.9	21.6	-32.5	300.0
Neck Force	Y	Newtons	9.7	300.0	-380.0	18.1
Neck Force	Z	Newtons	297.9	21.9	-740.1	16.2
Neck Force Resultant	N/A	Newtons	822.8	15.8		
Neck Moment	X	Nm	1.8	300.0	-47.3	51.3
Neck Moment	Y	Nm	27.8	15.6	-44.6	21.8
Neck Moment	Z	Nm	3.2	300.0	-19.1	21.2
Neck Moment Resultant	N/A	Nm	59.0	21.8		

HEAD INJURY CRITERIA (HIC15)

Location	SID-IIs			
	HIC15	I ¹	I ²	Avg G
Head CG	4.1	13.1	16.1	17.9

UPPER NECK NIJ VALUES

Location	SID-IIs			
	Ntf	Nte	Ncf	Nce
Upper Neck	0.20	0.13	0.28	0.11

DATA SHEET NO. 6**HIGH SPEED CAMERA LOCATIONS AND DATA**Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No.: M20155201TWG2Test Program: TWG 3.3.5.2 Test Date: 09/16/15**CAMERA LOCATIONS**

No.	Camera View	Location (mm)			Angle (Deg.)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	High Speed Front View	2545	-180	-1420	8.1	50	1000
2	High Speed 3/4 View	2535	-1130	-1150	8.5	35	1000
3	High Speed Side View	2715	-125	-1050	2.8	24	1000
4	Real Time	2715	-125	-1150	2.8	24	30

Coordinates: +X = forward of vehicle relative to dummy's head CG

+Y = right of vehicle relative to dummy's head CG

+Z = into ground

APPENDIX A
PHOTOGRAPHS

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FIGURE 1. Right Front ¾ View, As Received



FIGURE 2. Vehicle Certification Label



FIGURE 3. Post-Test Left Front 3/4 View of NCAP Side MDB Impact Test



FIGURE 4. Post-Test Left Side View of NCAP Side MDB Impact Test



FIGURE 5. Post-Test Left Rear ¾ View of NCAP Side MDB Impact Test



FIGURE 6. Post-Test Right Side View of NCAP Side MDB Impact Test



FIGURE 7. Pre-Test Dummy Position, Left Side View



FIGURE 8. Post-Test Dummy Position, Left Side View



FIGURE 9. Pre-Test Dummy Position, ¾ View



FIGURE 10. Post-Test Dummy Position, ¾ View



FIGURE 11. Pre-Test Dummy Position, Front View



FIGURE 12. Post-Test Dummy Position, Front View



FIGURE 13. Pre-Test Dummy Position, Close-Up Front View



FIGURE 14. Post-Test Dummy Position, Close-Up Front View



FIGURE 15. Pre-Test Dummy Position, Close-Up Rear View



FIGURE 16. Post-Test Dummy Position, Close-Up Rear View



FIGURE 17. Post-Test Airbags, Left Side View



FIGURE 18. Post-Test Airbags, Left Front ¾ View

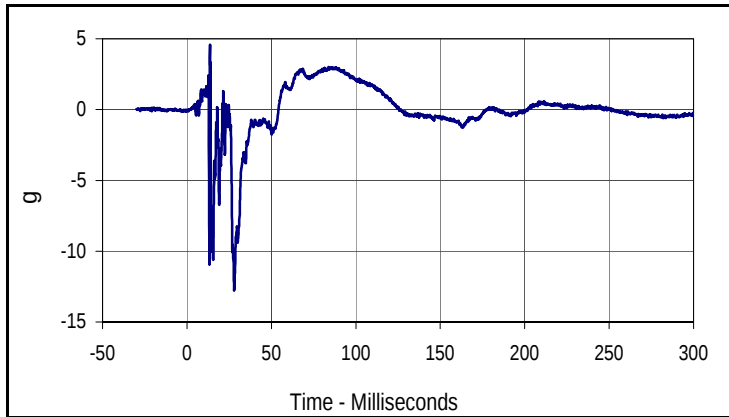
APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

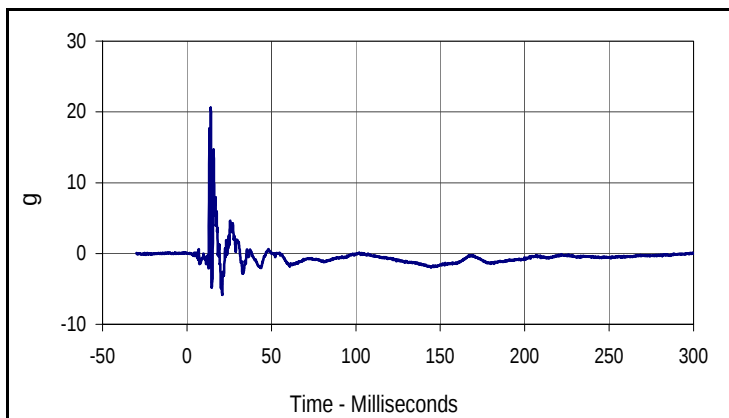
Plot		Page
1	SID-IIs Head X	B-1
2	SID-IIs Head Y	B-1
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Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan
 Test Program: TWG 3.3.5.2

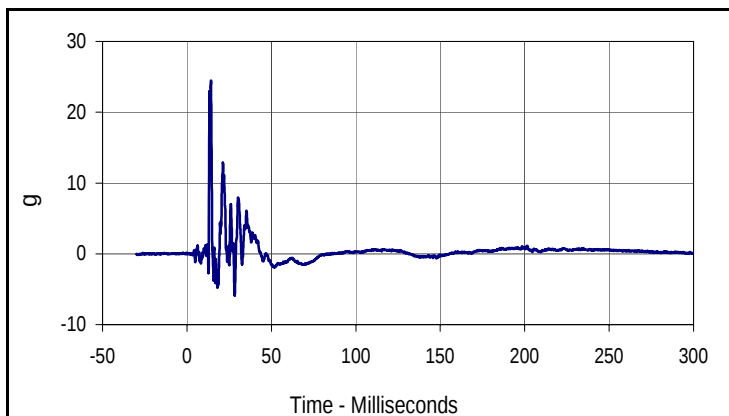
Test Date: 9/16/15
 NHTSA No.: M20155201TWG2



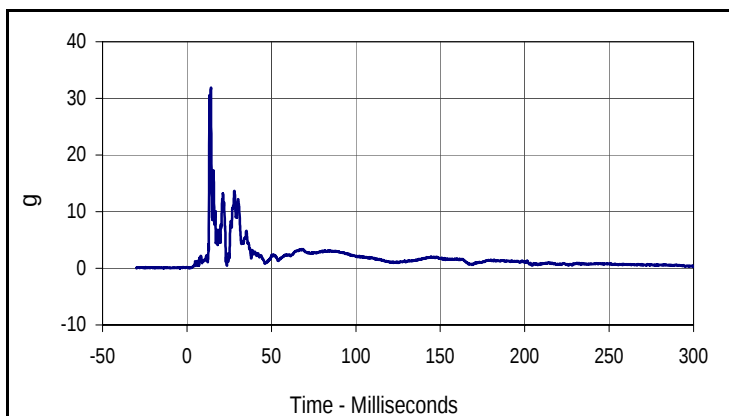
Curve Description			
SID-IIs Head X			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
4.5	13.6	-12.8	27.9



Curve Description			
SID-IIs Head Y			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
20.5	14.1	-5.8	20.8



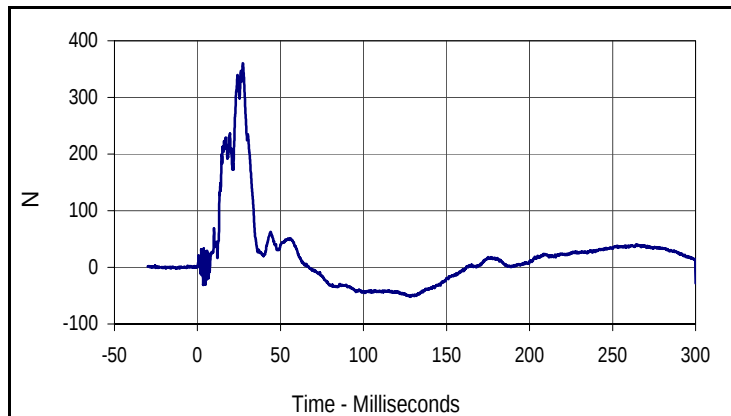
Curve Description			
SID-IIs Head Z			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
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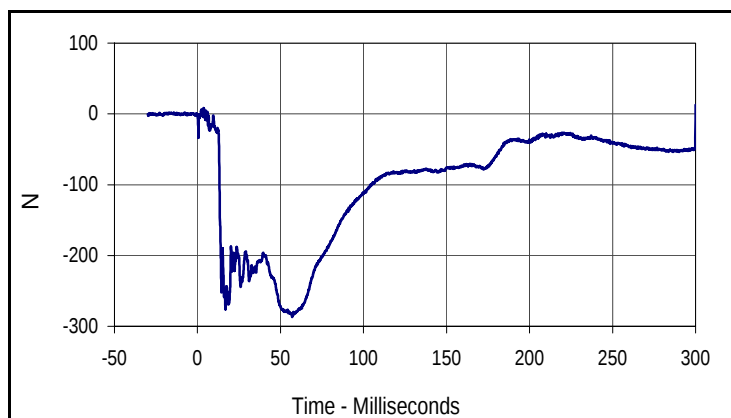
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SID-IIs Head Resultant			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
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Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan
 Test Program: TWG 3.3.5.2

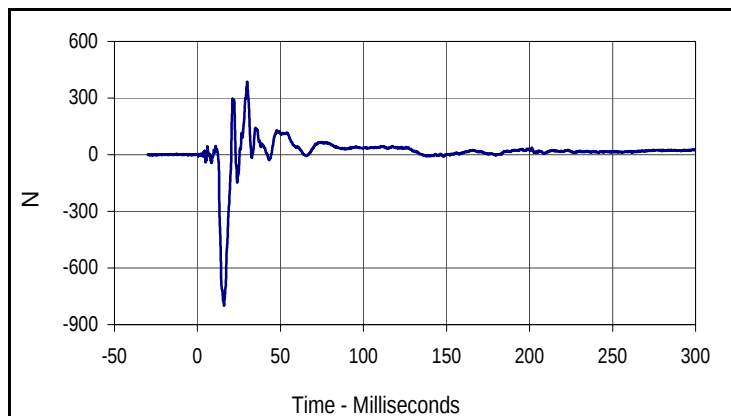
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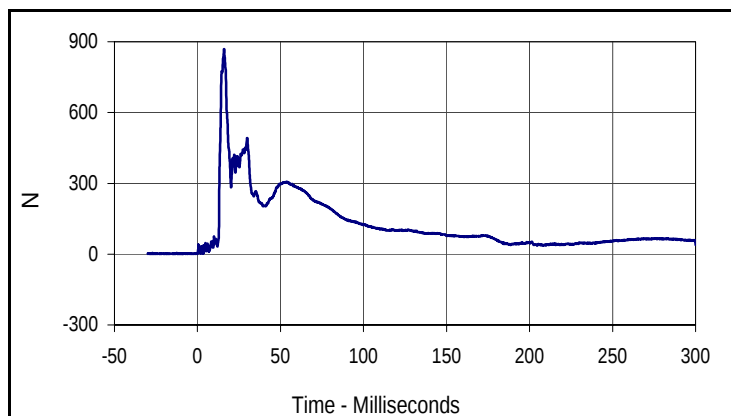
Curve Description			
SID-IIs Upper Neck Force X			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
360.2	27.3	-52.0	128.1



Curve Description			
SID-IIs Upper Neck Force Y			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
12.9	300.0	-286.8	57.0



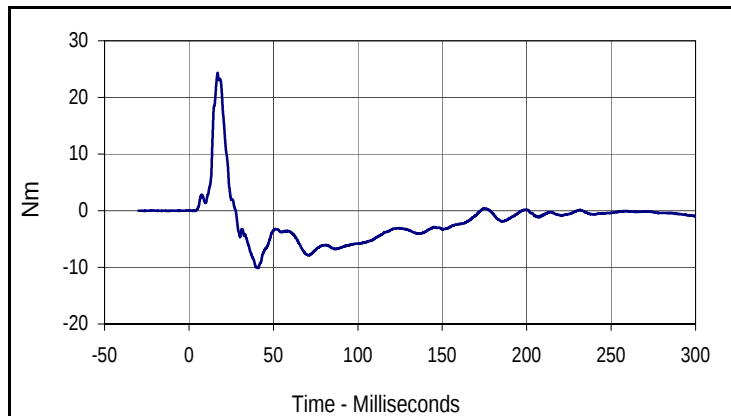
Curve Description			
SID-IIs Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
007	FIL	1000	N
Max	Time	Min	Time
386.4	29.9	-799.2	16.0



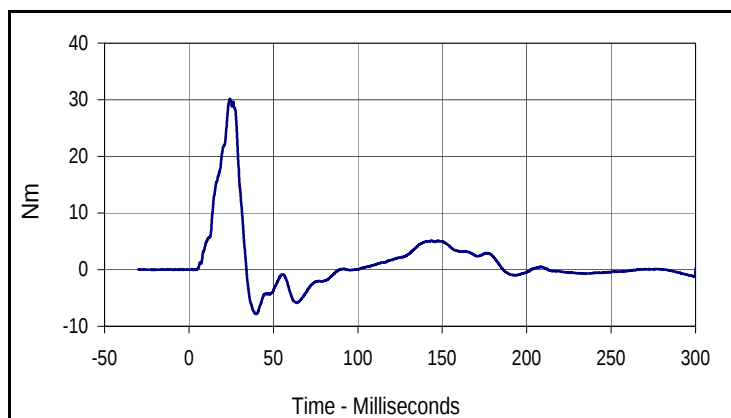
Curve Description			
SID-IIs Upper Neck Force Resultant			
Plot No.	Type	SAE Class	Units
008	RES	1000	N
Max	Time	Min	Time
868.9	16.1	0.5	0.1

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan
 Test Program: TWG 3.3.5.2

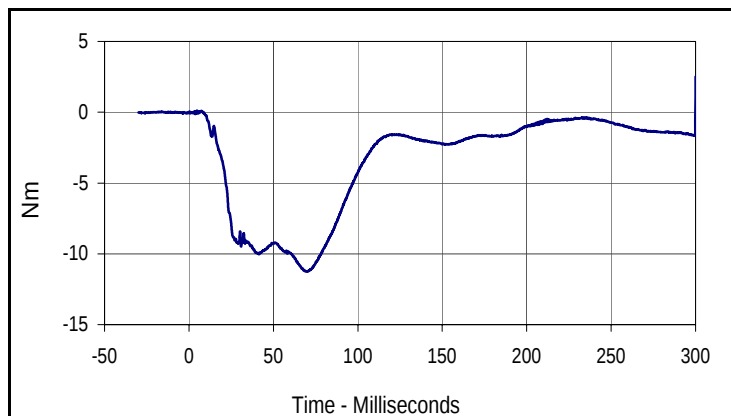
Test Date: 9/16/15
 NHTSA No.: M20155201TWG2



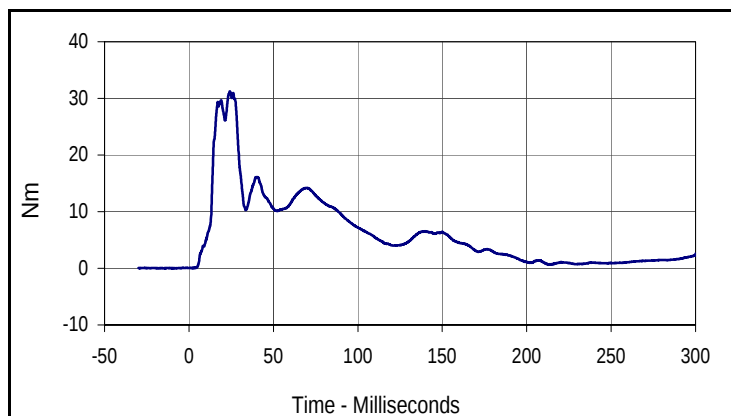
Curve Description			
SID-IIs Upper Neck Moment X			
Plot No.	Type	SAE Class	Units
009	FIL	600	Nm
Max	Time	Min	Time
24.3	16.9	-10.1	40.9



Curve Description			
SID-IIs Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
010	FIL	600	Nm
Max	Time	Min	Time
30.2	24.2	-7.8	39.9



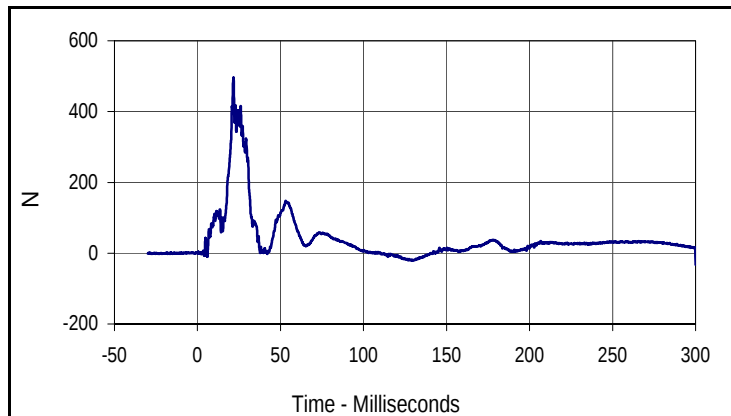
Curve Description			
SID-IIs Upper Neck Moment Z			
Plot No.	Type	SAE Class	Units
011	FIL	600	Nm
Max	Time	Min	Time
2.5	300.0	-11.3	70.5



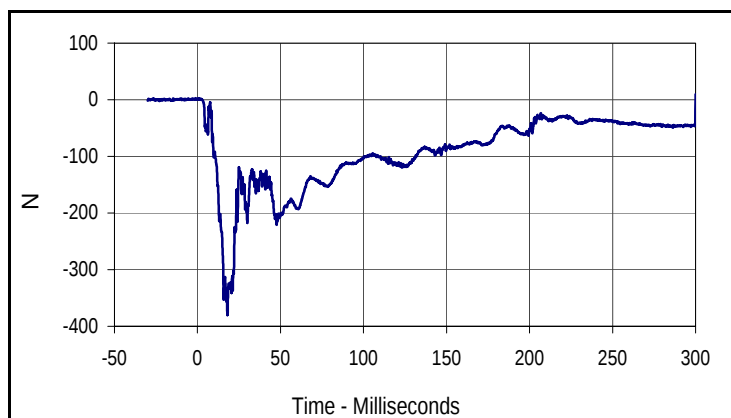
Curve Description			
SID-IIs Upper Neck Moment Resultant			
Plot No.	Type	SAE Class	Units
012	RES	600	Nm
Max	Time	Min	Time
31.2	2.0	0.0	2.0

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan
 Test Program: TWG 3.3.5.2

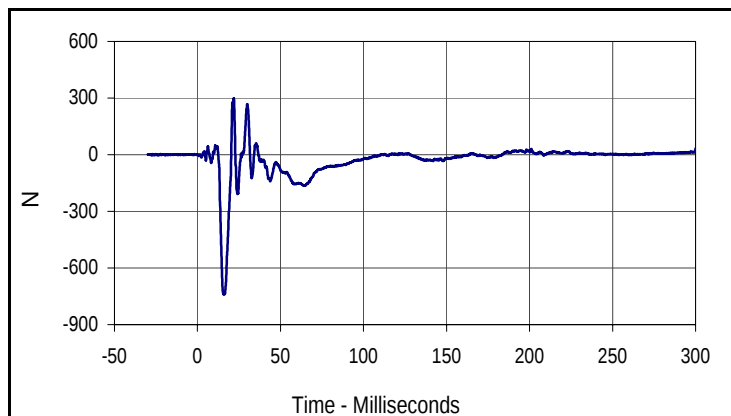
Test Date: 9/16/15
 NHTSA No.: M20155201TWG2



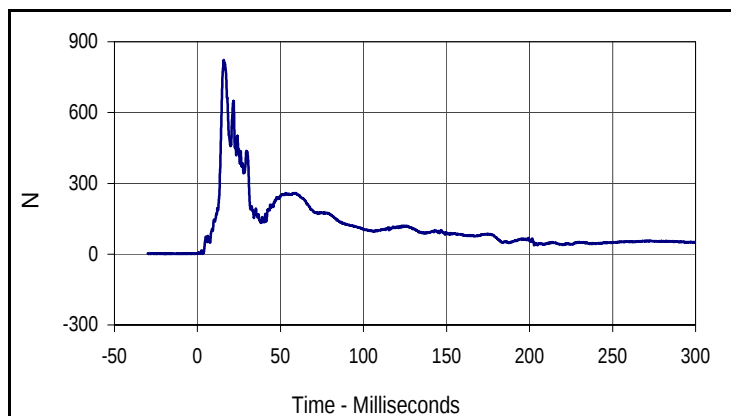
Curve Description			
SID-IIs Lower Neck Force X			
Plot No.	Type	SAE Class	Units
013	FIL	1000	N
Max	Time	Min	Time
495.9	21.6	-32.5	300.0



Curve Description			
SID-IIs Lower Neck Force Y			
Plot No.	Type	SAE Class	Units
014	FIL	1000	N
Max	Time	Min	Time
9.7	300.0	-380.0	18.1



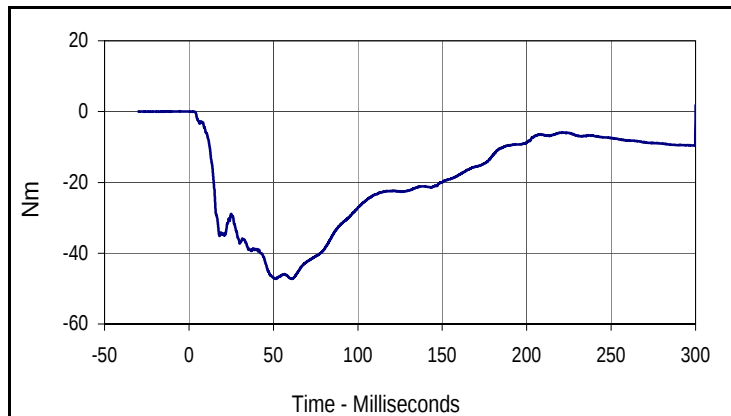
Curve Description			
SID-IIs Lower Neck Force Z			
Plot No.	Type	SAE Class	Units
015	FIL	1000	N
Max	Time	Min	Time
297.9	21.9	-740.1	16.2



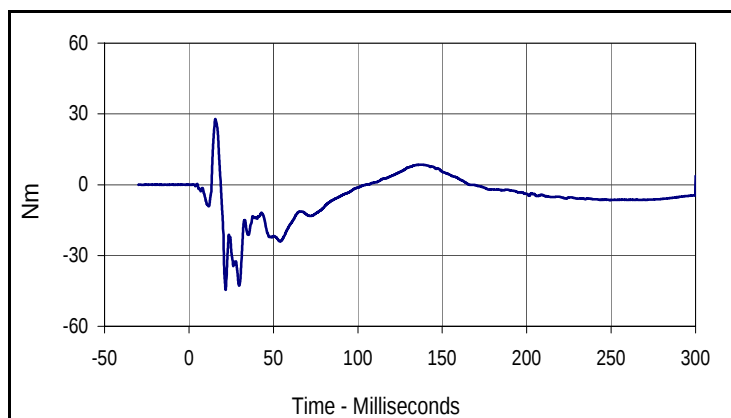
Curve Description			
SID-IIs Lower Neck Force Resultant			
Plot No.	Type	SAE Class	Units
016	RES	1000	N
Max	Time	Min	Time
822.8	15.8	1.1	3.1

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan
 Test Program: TWG 3.3.5.2

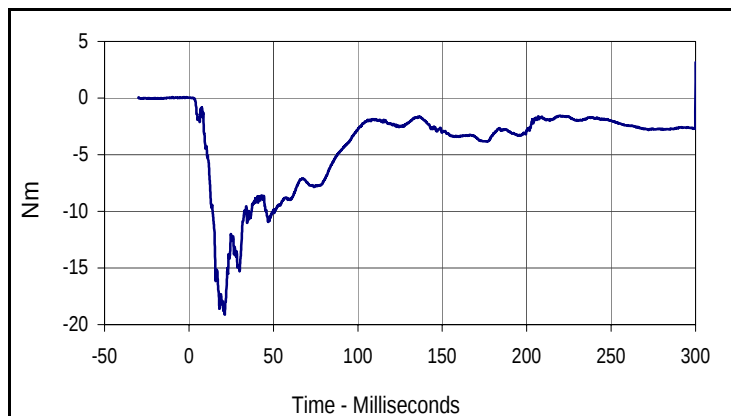
Test Date: 9/16/15
 NHTSA No.: M20155201TWG2



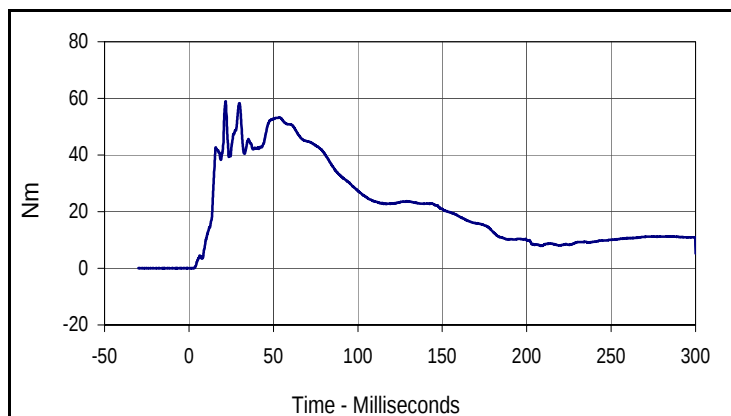
Curve Description			
SID-IIs Lower Neck Moment X			
Plot No.	Type	SAE Class	Units
017	FIL	600	Nm
Max	Time	Min	Time
1.8	300.0	-47.3	51.3



Curve Description			
SID-IIs Lower Neck Moment Y			
Plot No.	Type	SAE Class	Units
018	FIL	600	Nm
Max	Time	Min	Time
27.8	15.6	-44.6	21.8



Curve Description			
SID-IIs Lower Neck Moment Z			
Plot No.	Type	SAE Class	Units
019	FIL	600	Nm
Max	Time	Min	Time
3.2	300.0	-19.1	21.2



Curve Description			
SID-IIs Lower Neck Moment Resultant			
Plot No.	Type	SAE Class	Units
020	RES	600	Nm
Max	Time	Min	Time
59.0	21.8	0.0	1.8

APPENDIX C
INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

TWG 3.3.5.2
Instrumentation Data Channel Assignments
A.T.D. Serial Number 294
9/16/2015
2015 Nissan Altima 2.5 S 4-Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
1	HEAD	X	P50099	Accel.,full bridge	Endevco	7264C-2K	G
2	HEAD	Y	P52013	Accel.,full bridge	Endevco	7264C-2K	G
3	HEAD	Z	P64127	Accel.,full bridge	Endevco	7264C-2K	G
4	UPPER NECK FORCE	X	1643	Load cell, six axis neck	FTSS	IF-205	N
5	UPPER NECK FORCE	Y	1643	Load cell, six axis neck	FTSS	IF-205	N
6	UPPER NECK FORCE	Z	1643	Load cell, six axis neck	FTSS	IF-205	N
7	UPPER NECK MOMENT	X	1643	Load cell, six axis neck	FTSS	IF-205	Nm
8	UPPER NECK MOMENT	Y	1643	Load cell, six axis neck	FTSS	IF-205	Nm
9	UPPER NECK MOMENT	Z	1643	Load cell, six axis neck	FTSS	IF-205	Nm
10	LOWER NECK FORCE	X	DR8678	Load cell, six axis neck	FTSS	IF-269	N
11	LOWER NECK FORCE	Y	DR8678	Load cell, six axis neck	FTSS	IF-269	N
12	LOWER NECK FORCE	Z	DR8678	Load cell, six axis neck	FTSS	IF-269	N
13	LOWER NECK MOMENT	X	DR8678	Load cell, six axis neck	FTSS	IF-269	Nm
14	LOWER NECK MOMENT	Y	DR8678	Load cell, six axis neck	FTSS	IF-269	Nm
15	LOWER NECK MOMENT	Z	DR8678	Load cell, six axis neck	FTSS	IF-269	Nm

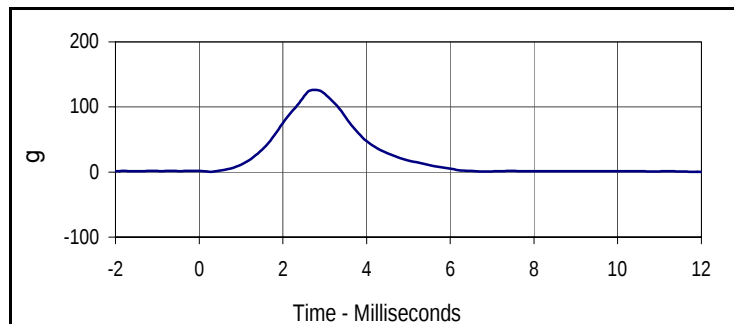
APPENDIX D
PRE-TEST DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: SID IIs Head Drop Test
 ATD Serial No.: 294

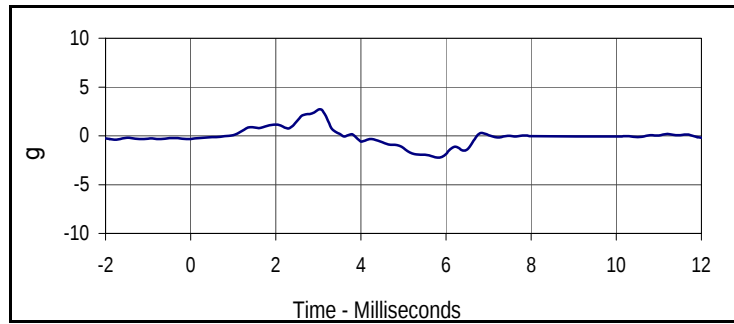
Test Date: 9/7/15
 Test I.D.: 294HDM20155201



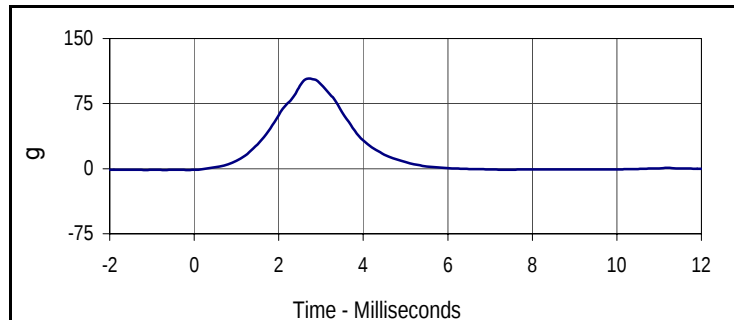
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	307	Pass
Temperature During Soak	Max	18.9 to 25.6	21.3	Pass
	Min		21.2	Pass
Humidity During Soak	Max	10.0 to 70.0	34.2	Pass
	Min		19.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	32.0	Pass
Peak Head Resultant Acceleration	g	115 to 137	126.3	Pass
Peak Head X Acceleration	g	<15	2.7	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	1.6	Pass
Overall Test Results				Pass



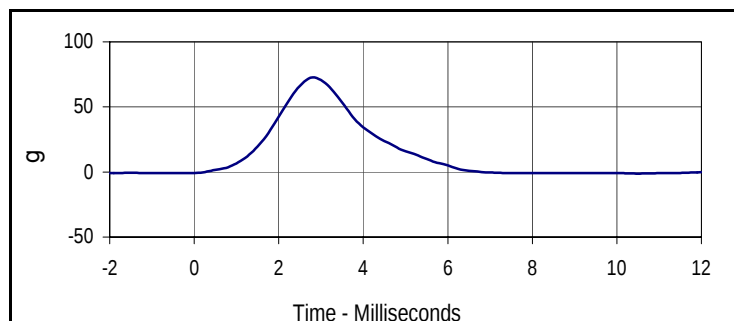
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	g
Max	Time	Min	Time
126.3	2.7	0.3	12.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	g
Max	Time	Min	Time
2.7	3.0	-2.2	5.8



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	g
Max	Time	Min	Time
103.9	2.7	-1.9	-20.0



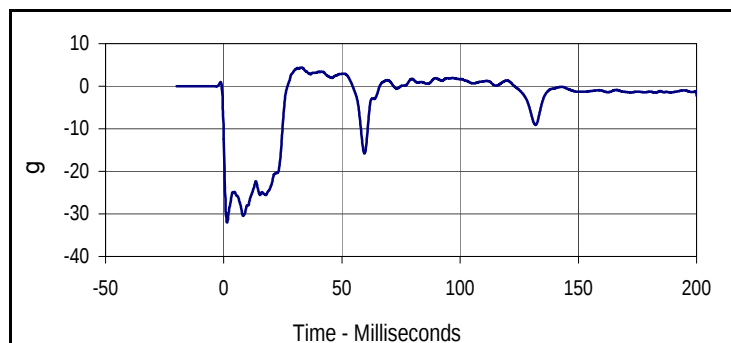
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	g
Max	Time	Min	Time
72.6	2.8	-1.2	10.5

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 294

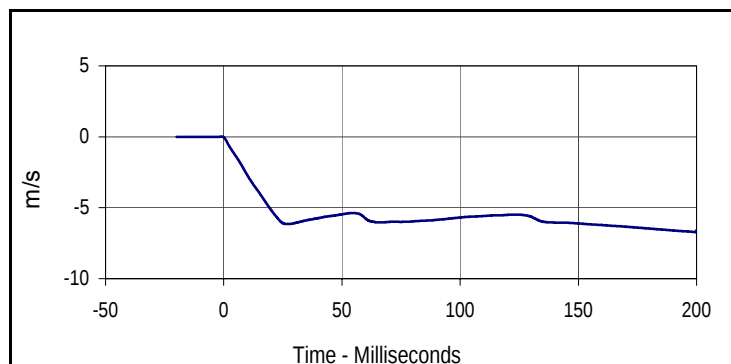
Test Date: 9/7/15
 Test I.D.: 294NBM20155201



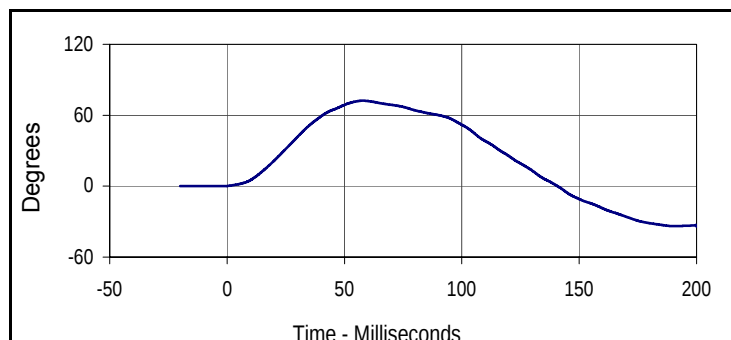
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	372	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.2	Pass
	Min	%		19.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.2	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.57	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.71	Pass
	15 msec	m/s	-3.30 to -4.10	-3.94	Pass
	20 msec	m/s	-4.40 to -5.40	-5.16	Pass
	25 msec	m/s	-5.40 to -6.10	-6.09	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.15	Pass
D-Plane Rotation	Max	Degrees	71 to 81	72.3	Pass
	Time	msec	50 to 70	57.8	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-41.1	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	117.8	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	g
Max	Time	Min	Time
4.4	0.0	-32.1	0.0



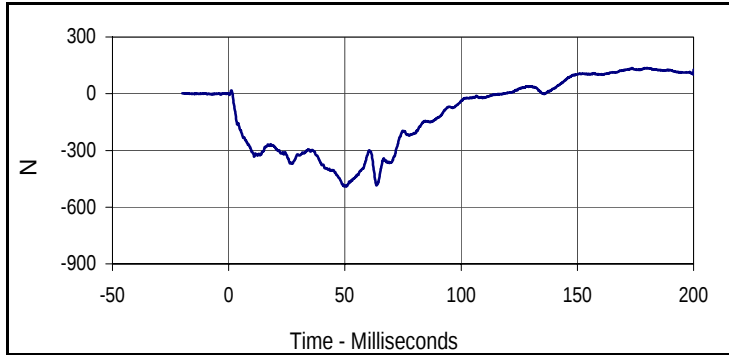
Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.9	-6.7	199.9



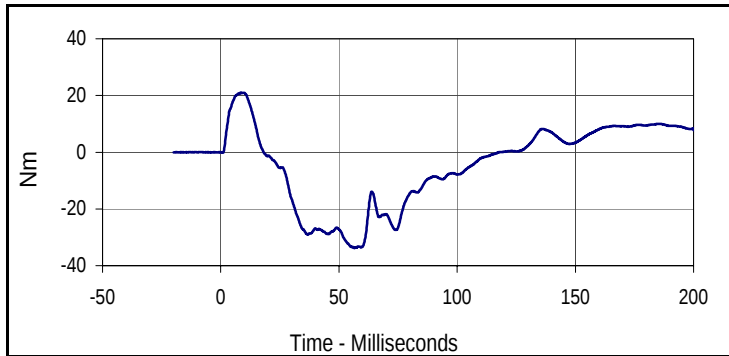
Curve Description			
D-Plane Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
72.3	57.8	-34.4	200.0

Test Program: SID IIs Neck Flexion Test
 ATD Serial No.: 294

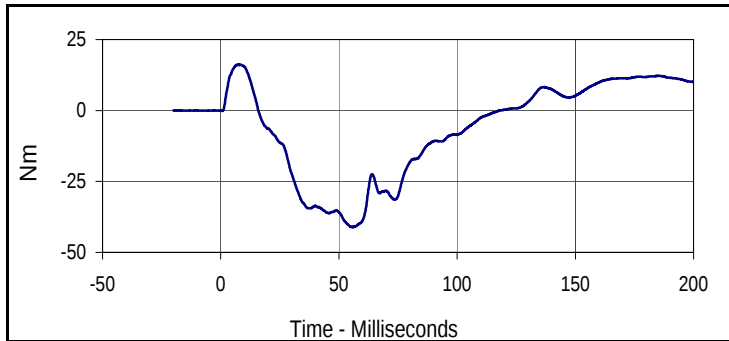
Test Date: 9/7/15
 Test I.D.: 294NBM20155201



Curve Description			
Neck Force Y			
Plot No.	Type	SAE Class	Units
004	FIL	1000	N
Max	Time	Min	Time
135.3	179.9	-490.4	49.7



Curve Description			
Neck Moment X			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
21.0	8.4	-33.8	56.5



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
006	FIL	600	Nm
Max	Time	Min	Time
16.3	7.5	-41.1	56.4