FINAL REPORT NUMBER 201UI-MGA-11-14

SAFETY COMPLIANCE TESTING FOR FMVSS 201
Occupant Protection In Interior Impact
Upper Interior Head Impact Protection

NISSAN MOTOR CO., LTD.
2012 Nissan NV 1500 V6 S
NHTSA No. CC5200

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083

Test Dates: July 28-29, 2011
Report Date: August 2, 2011

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
1200 New Jersey Avenue, SE
West Building
WASHINGTON, D.C. 20590

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16. Abstract A compliance test series was conducted on the subject 2012 Nissan NV 1500 V6 S, NHTSA No. CC5200, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-201U-01 for the determination of FMVSS 201 compliance. The testing was conducted at MGA Research Corporation in Troy, Michigan on July 28-29, 2011. Test failures identified were as follows: None The data recorded indicates that the 2012 Nissan NV 1500 V6 S tested appears to comply with the upper interior requirements of FMVSS 201.			
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this head impact compliance test was to determine whether the subject vehicle, a 2012 Nissan NV 1500 V6 S, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted on July 28-29, 2011 on a 2012 Nissan NV 1500 V6 S, manufactured by Nissan Motor Co., Ltd.

All tests were conducted in accordance with the U. S. Department of Transportation, National Highway Traffic Safety Administration's Laboratory Test Procedure TP-201U-01 dated April 3, 1998 and the corresponding MGA Research Corporation's FMVSS 201U procedure number MGATP201U_FRAME#2 dated November 9, 2009.

All tests were conducted at MGA Research Corporation in Troy, Michigan and were performed by MGA engineers and technicians. The FMVSS 201U impactor test machine was used to conduct the testing. Target locations were determined by using a Coordinate Measurement Machine in conjunction with the MGA EZ-Target™ program and MGA procedure MGATP201U_Test Series dated November 9, 2009.

2.0 COMPLIANCE TEST DATA SUMMARY

The 2012 Nissan NV 1500 V6 S was equipped with A, B, O, and rear-pillars, an adjustable seat belt anchorage on each B-pillar, and assist handles located on each A-pillar.

Upon completion of targeting the test vehicle, twelve (12) targets were chosen to be impacted based upon engineering judgment and certification test data provided by the manufacturer. The twelve (12) targets chosen were:

AP1	BP1	FH2	UR1@SR2B
AP2	BP2	SR1	UR4@BP
AP3	FH1	SR2B	UR5@BP

The 2012 Nissan NV 1500 V6 S tested appears to comply with the upper interior performance criteria for FMVSS 201. The HIC(d) measured using the Part 572L (Free Motion Headform) was below 1000 for each tested component.

TABLE 2-1

SUMMARY TABLE OF TEST RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2012 Nissan NV 1500 V6 S

VEH. NHTSA NO.: CC5200 VIN: 1N6BF0KL5CN103594 COLOR: Blizzard

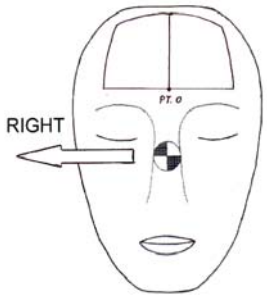
VEH. BUILD DATE: April, 2011 TEST DATES: July 28-29, 2011

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

TARGET	VEHICLE SIDE	HORIZONTAL ANGLE (deg)	VERTICAL ANGLE (deg)	VELOCITY (kph)	HIC(d)	FMH HIC	IMPACT ON FMH (mm)	
							Above	Left/Right
AP1	Left	250	50	23.5	859	919	6	24 Right
AP2	Right	153	10	23.6	493	433	36	2 Right
AP3	Left	208	0	23.4	570	535	9	2 Right
BP1	Left	270	3	23.8	512	458	71	2 Left
BP2	Left	270	5	23.7	863	923	14	4 Left
FH1	Right	180	43	23.7	718	732	6	12 Right
FH2	Left	180	50	23.5	552	511	8	6 Left
SR1	Right	90	5	23.7	284	156	58	29 Right
SR2B	Right	90	24	23.8	446	371	50	2 Left
UR1@SR2B	Left	270	50	23.5	560	522	37	7 Left
UR4@BP	Right	90	50	23.6	578	546	40	4 Right
UR5@BP	Right	50	50	23.8	241	98	7	5 Left

Above and left/right refers to the position relative to reference pt. 0 where the target made contact with the Free Motion Headform. See the diagram below for details.



POST TEST COMMENTS:

The following description lists any post-test damage or other test observations for each target.

AP1 Left: Headliner deformation.

AP2 Right: Dislodged trim.

BP2 Left: Dislodged trim, D-ring compression.

FH1 Right: Sunglasses holder opened, headliner retaining fastener detached.

FH2 Left: Headliner deformation.

SR2B Right: Headliner deformation, dislodged headliner, headliner retaining fastener detached.

UR1@SR2B Left: Headliner deformation, dislodged trim, sunglasses holder opened.

UR4@BP Right: Headliner retaining fastener removed, sunglasses holder opened.

UR5@BP Right: Headliner deformation, dislodged headliner, headliner retaining fastener detached.

REMARKS:

The targets listed were impacted in the following order:

Left: AP3, AP1, FH2, UR1@SR2B, BP2, BP1

Right: SR2B, SR1, UR4@BP, UR5@BP, FH1, AP2

The 150 mm rule was observed for targets horizontal to each other and the 200 mm rule was observed for vertical components.

RECORDED BY: Nathaniel Newth DATE: July 29, 2011

APPROVED BY: Helen A. Kaleto

TABLE 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2012 Nissan NV 1500 V6 S

VEH. NHTSA NO.: CC5200 VIN: 1N6BF0KL5CN103594 COLOR: Blizzard

VEH. BUILD DATE: April, 2011 TEST DATES: July 28-29, 2011

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

INTERIOR TRIM INFORMATION: A, B, O, and rear-pillars, an adjustable seat belt anchorage on each B-pillar, and assist handles located on each A-pillar.

SUNROOF INFORMATION:

Installed: _____Yes __X__ No

Operation: _____Electric ____ Manual

SIDE RAIL CURTAIN AIRBAG INFORMATION:

Installed: ____Yes __X__ No

ROLL-BAR INFORMATION:

Installed: _____Yes __X__ No

Padded: _____Yes __X__ No

Braces: _____Yes __X__ No

GENERAL INFORMATION:

Date Received: June 10, 2011; Odometer Reading 43 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Nissan Motor Co., Ltd.

Date of Manufacture: April, 2011;VIN: 1N6BF0KL5CN103594

GVWR: 3878 kg; GAWR FRONT: 1735 kg;

GAWR REAR: 2665 kg;

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 350 kPa REAR: 550 kPa

Recommended Tire Size: LT245/70R17E

Recommended Cold Tire Pressure:

FRONT: 350 kPa REAR: 550 kPa

Size of Tire on Test Vehicle: LT245/70R17E

Type of Spare Tire: LT245/70R17E; Space Saver:__; Standard X

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench__; Bucket X; Split Bench __

Number of Occupants: Front 2; Rear 0; TOTAL 2

VEHICLE CAPACITY WEIGHT:

Vehicle Capacity Weight (VCW) = 1175 kg

No. of Occupants x 68 kg = 136 kg

Rated Cargo/Luggage Weight (RCLW) = 1039 kg (difference)

WEIGHT OF TEST VEHICLE AS DELIVERED AT LABORATORY: (with maximum fluids)

Right Front =	703.0 kg	Right Rear =	620.0 kg
Left Front =	661.5 kg	Left Rear =	625.0 kg
TOTAL FRONT =	1364.5 kg	TOTAL REAR =	1245.0 kg
% Total Weight =	52.3 %	% Total Weight =	47.7 %

TOTAL DELIVERED WEIGHT = 2609.5 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 2609.5 kg

Max. Test Cargo/Luggage Weight = 136.0 kg

Target Test Weight = 2745.5 kg

WEIGHT OF TEST VEHICLE FULLY LOADED:

Right Front =	688.0 kg	Right Rear =	692.0 kg
Left Front =	657.5 kg	Left Rear =	706.0 kg
TOTAL FRONT =	1345.5 kg	TOTAL REAR =	1398.0 kg
% Total Weight =	49.0 %	% Total Weight =	51.0 %

TOTAL TEST WEIGHT = 2743.5 kg

Weight of ballast secured in vehicle's cargo area = 134.0 kg

TEST VEHICLE ATTITUDE:

AS DELIVERED: Right Front 909 mm; Left Front 911 mm;
Right Rear 931 mm; Left Rear 935 mm;
Pitch Angle at Right Door Sill = 0.4 Rear is higher
Pitch Angle at Left Door Sill = 0.3 Rear is higher
Roll Angle at Front Bumper = 0.2 Left is higher
Roll Angle at Rear Bumper = 0.3 Right is higher

FULLY LOADED: Right Front 909 mm; Left Front 918 mm;
Right Rear 918 mm; Left Rear 925 mm;
Pitch Angle at Right Door Sill = 0.2 Front is higher
Pitch Angle at Left Door Sill = 0.1 Front is higher
Roll Angle at Front Bumper = 0.4 Left is higher
Roll Angle at Rear Bumper = 0.0

AS TARGETED: Right Front 1062 mm; Left Front 1063 mm;
Right Rear 1040 mm; Left Rear 1039 mm;
Pitch Angle at Right Door Sill = 0.1 Front is higher
Pitch Angle at Left Door Sill = 0.1 Front is higher
Roll Angle at Front Bumper = 0.2 Left is higher
Roll Angle at Rear Bumper = 0.3 Right is higher

AS TESTED ON RIGHT SIDE:

Pitch Angle at Right Door Sill =	0.2 Front is higher
Pitch Angle at Left Door Sill =	0.1 Front is higher
Roll Angle at Front Bumper =	0.4 Left is higher
Roll Angle at Rear Bumper =	0.0

AS TESTED ON LEFT SIDE:

Pitch Angle at Right Door Sill =	0.2 Front is higher
Pitch Angle at Left Door Sill =	0.1 Front is higher
Roll Angle at Front Bumper =	0.2 Left is higher
Roll Angle at Rear Bumper =	0.3 Right is higher

VEHICLE WHEELBASE = 3720 mm

REMARKS: The seat travel distance was measured to be 240 mm for the driver front seat and 240 mm for the passenger front seat.

RECORDED BY: Nathaniel Newth DATE: July 18, 2011

APPROVED BY: Helen A. Kaleto

TABLE 2-3

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

VEH. MOD YR/MAKE/MODEL/BODY: 2012 Nissan NV 1500 V6 S

VEH. NHTSA NO.: CC5200 VIN: 1N6BF0KL5CN103594 COLOR: Blizzard

VEH. BUILD DATE: April, 2011 TEST DATES: July 28-29, 2011

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

	HORIZONTAL ANGLE SPECIFIED RANGE	MINIMUM HORIZONTAL ANGLE	MAXIMUM HORIZONTAL ANGLE
A-PILLAR	L 195º-255º	L 207.2º	L 250.2º
	R 105º-165º	R 109.7º	R 152.8º
B-PILLAR	L 195º-345º	L 270.0º	L 277.4º
	R 15º-165º	R 82.4º	R 90.0º

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: Nathaniel Newth DATE: July 18, 2011

APPROVED BY: Helen A. Kaleto

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 2012 Nissan NV 1500 V6 S

VEH. NHTSA NO.: CC5200 VIN: 1N6BF0KL5CN103594 COLOR: Blizzard

VEH. BUILD DATE: April, 2011 TEST DATES: July 28-29, 2011

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

VERTICAL IMPACT ANGLE RANGES

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
FRONT HEADER	FH1	L 0º-50º	L 0º	L 43º
		R 0º-50º	R 0º	R 43º
	FH2	L 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º
SIDE RAIL	SR1	L 0º-50º	L 0º	L 5º
		R 0º-50º	R 0º	R 5º
	SR2A	L 0º-50º	L 0º	L 24º
		R 0º-50º	R 0º	R 24º
	SR2B	L 0º-50º	L 0º	L 24º
		R 0º-50º	R 0º	R 24º
A-PILLAR	AP1	L -5º-50º	L -5º	L 50º
		R -5º-50º	R -5º	R 50º
	AP2	L -5º-50º	L -5º	L 10º
		R -5º-50º	R -5º	R 10º
	AP3	L -5º-50º	L -5º	L 0º
		R -5º-50º	R -5º	R 0º

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
B-PILLAR	BP1	L -10º-50º	L -10º	L 3º
		R -10º-50º	R -10º	R 40º
	BP2*	L 0º-50º	L 0º	L 5º
		R 0º-50º	R 0º	R 5º
	BP3	L -10º-50º	L -10º	L 5º
		R -10º-50º	R -10º	R 5º
	BP4	L -10º-50º	L N/A	L N/A
		R -10º-50º	R N/A	R N/A
UPPER ROOF 1		0º-50º	0º	50º
UPPER ROOF 2		0º-50º	0º	50º
UPPER ROOF 3		0º-50º	0º	50º
UPPER ROOF 4		0º-50º	0º	50º
UPPER ROOF 5		0º-50º	0º	50º

As determined using the Procedures specified in S8.13.4.2. *Target BP2 is a seat belt anchorage location.

RECORDED BY: Nathaniel Newth DATE: July 18, 2011

APPROVED BY: Helen A. Kaleto

TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2012 Nissan NV 1500 V6 S

VEH. NHTSA NO.: CC5200 VIN: 1N6BF0KL5CN103594 COLOR: Blizzard

VEH. BUILD DATE: April, 2011 TEST DATES: July 28-29, 2011

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

Measurement	Description	Left Side	Right Side
M	Seat Fore/Aft Travel (Front seats)	240 mm	240 mm
Tº	Horizontal < {CG-F1 (Left Seat) to (Right A-Pillar)}	109.8º	--
A1º	360º - Tº	250.2º	--
Wº	Horizontal < {CG-2 (Left Seat) to (Left A-Pillar)}	207.2º	--
A2º	A2º = Wº	207.2º	--
Uº	Horizontal < {CG-2 (Left Seat) to (Left B-Pillar)}	277.4º	--
B1º	B1º = Uº	277.4º	--
Vº	Horizontal < {CG-R (Left Seat) to (Left B-Pillar)}	--	--
B2º	B2º = Vº	--	--
Wº (right)	Horizontal < {CG-F2 (Right Seat) to (Right A-Pillar)}	--	152.8º
A1º (right)	A1º (right) = Wº (right)	--	152.8º
T º (right)	Horizontal < {CG-F1 (Right Seat) to (Left A-Pillar)}	--	250.3º
A2º (right)	360º-Tº (right)	--	109.7º
V º (right)	Horizontal < {CG-R (Right Seat) to (Right B-Pillar)}	--	--
B1º (right)	B1º (right) = Vº (right)	--	--
U º (right)	Horizontal < {CG-F2 (Right Seat) to (Right B-Pillar)}	--	82.4º
B2º (right)	B2º (right) = Uº (right)	--	82.4º
J	A-Pillar {(Plane 3) – (Plane 5)}	407.5 mm	410.1 mm
J/2	J ÷ 2	203.8 mm	205.1 mm
D1	Upper Roof {(Plane A) – (Plane B)}	3887.0 mm	
D1/2	D1 ÷ 2	1943.5 mm	

Measurement	Description	Left Side	Right Side
D2	Upper Roof {(Plane C) – (Plane D)}	1714.0 mm	
D2/2	D2 ÷ 2	857.0 mm	
.35D1	.35 x D1	1360.5 mm	
.35D2	.35 x D2	599.9 mm	
N	B-Pillar {(BPR) – (lowest point on daylight opening forward of B-Pillar)}	649.1 mm	614.2 mm
N/2	B-Pillar {(BP3) – (lowest point on daylight opening forward of B-Pillar)}	324.6 mm	307.1 mm
N/4	B-Pillar {(BP4) – (lowest point on daylight opening forward of B-Pillar)}	162.3 mm	153.6 mm

As determined using the Procedures specified in S10.1-10.13.

SgRP Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	1517.0	-455.0	496.0	1517.0	455.0	496.0

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	1517.0	-455.0	496.0	1517.0	455.0	496.0

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
CGF1	1437.0	-455.0	1156.0	1437.0	455.0	1156.0
CGF2	1677.0	-455.0	1156.0	1677.0	455.0	1156.0

REFERENCE FOR VEHICLE COORDINATE SYSTEM (measured in millimeters):

Front driver front outboard seat bolt hole (x, y, z) = 1149.3, -686.5, 144.0

Front driver door upper striker bolt (x, y, z) = 1715.9, -896.3, 562.5

Front passenger door upper striker bolt (x, y, z) = 1715.9, 896.3, 562.5

REMARKS:

RECORDED BY: Nathaniel Newth DATE: July 18, 2011

APPROVED BY: Helen A. Kaleto

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2012 Nissan NV 1500 V6 S

VEH. NHTSA NO.: CC5200 VIN: 1N6BF0KL5CN103594 COLOR: Blizzard

VEH. BUILD DATE: April, 2011 TEST DATES: July 28-29, 2011

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

SUMMARY OF TARGETING RESULTS								
Target	**Location (mm)**			**Horizontal Angle (deg)**	**Vertical Angle (deg)**	**Relocation (Yes/No)**	**Extension (# of 25 mm Spheres)**	**Impact (Yes/No)**
	x	**y**	**z**					
A-Pillar Left Side								
AP1	1137.3	-798.1	1340.0	--	--	Yes	--	--
REL	1164.0	-756.7	1350.7	250	50	--	2	Yes
AP2	1041.7	-780.1	1252.9	208	10	No	--	No
AP3	988.6	-802.7	1135.4	208	0	No	--	Yes
A-Pillar Right Side								
AP1	1138.2	801.2	1342.4	--	--	Yes		--
REL	1161.4	758.9	1350.9	110	50	--	2	No
AP2	1039.2	778.3	1255.3	153	10	No	--	Yes
AP3	987.4	805.2	1138.2	153	0	No	--	No
B-Pillar Left Side								
BP1	1800.5	-674.4	1437.2	270	3	No	--	Yes
BP2	1764.8	-737.2	1089.8	270	5	No	--	Yes
BP3	1713.0	-765.7	1113.6	--	--	Yes	--	--
REL	1751.8	-737.2	1089.8	270	5	--	2	No
B-Pillar Right Side								
BP1	1787.0	613.0	1399.2	90	40	No	--	No
BP2	1761.1	738.2	1091.0	90	5	No	--	No
BP3	1709.5	767.1	1092.7	--	--	Yes	--	--

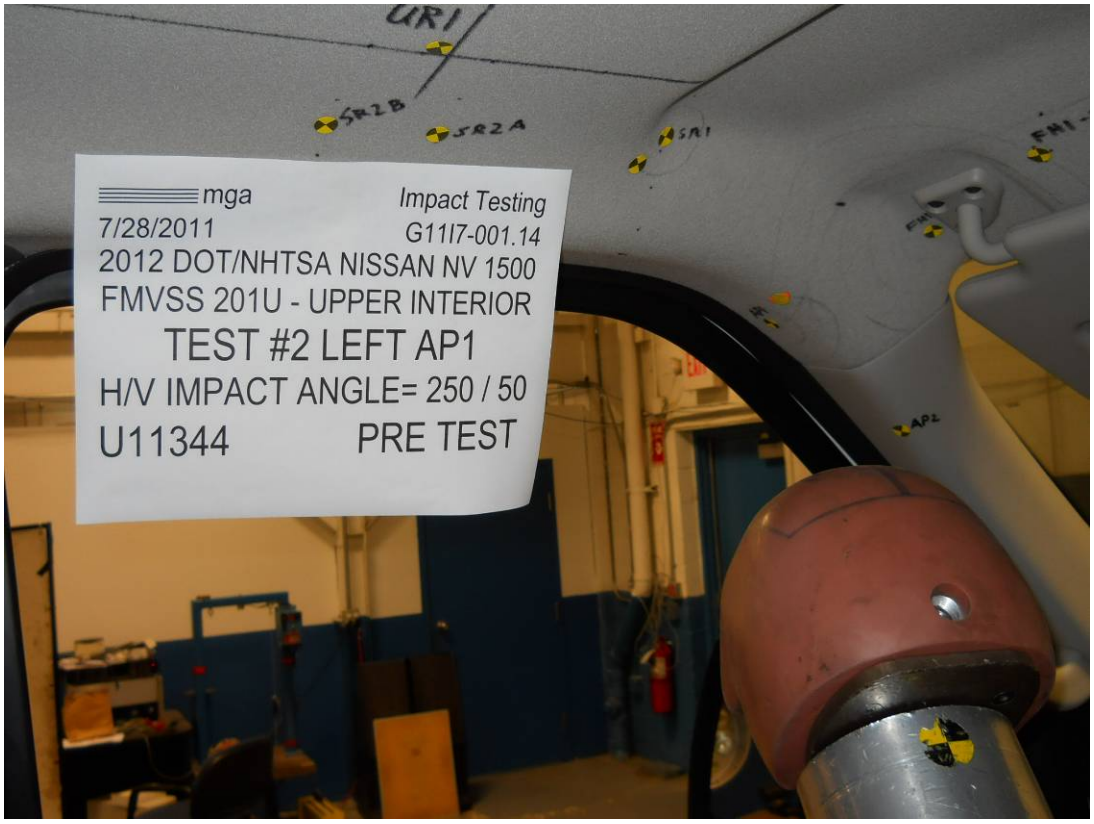
SUMMARY OF TARGETING RESULTS								
Target	**Location (mm)**			**Horizontal Angle (deg)**	**Vertical Angle (deg)**	**Relocation (Yes/No)**	**Extension (# of 25 mm Spheres)**	**Impact (Yes/No)**
	x	**y**	**z**					
REL	1748.1	738.2	1091.0	90	5	--	2	No
Front Header Left Side								
FH1	1056.5	-708.1	1389.9	--	--	Yes	--	--
REL	1089.5	-585.5	1411.1	180	43	--	5	No
FH2	1022.9	-563.6	1380.5	180	50	No	--	Yes
Front Header Right Side								
FH1	1060.6	712.3	1391.1	--	--	Yes	--	--
REL	1093.2	590.1	1414.2	180	43	--	5	Yes
FH2	1026.8	568.6	1381.5	180	50	No	--	No
Side Rail Left Side								
SR1	1287.9	-687.0	1440.3	--	--	Yes	--	--
REL	1309.5	-693.1	1424.5	270	5	--	1	No
SR2A	1437.5	-681.6	1432.0	270	24	No	--	No
SR2B	1501.2	-679.5	1434.0	270	24	No	--	No
Side Rail Right Side								
SR1	1287.9	683.2	1448.0	--	--	Yes	--	--
REL	1308.4	689.3	1432.0	90	5	--	1	Yes
SR2A	1437.5	681.0	1435.2	90	24	No	--	No
SR2B	1486.6	682.9	1435.9	90	24	No	--	Yes
Upper Roof Left Side								
UR1@SR2B	1474.1	-591.7	1446.5	270	50	No	--	Yes
UR3@BP	1787.4	-561.2	1462.7	270	50	No	--	No
Upper Roof Right Side								
UR2@SR2B	1474.7	594.5	1448.1	90	50	No	--	No
UR4@BP	1759.6	447.2	1476.0	90	50	No	--	Yes
UR5@BP	1599.7	554.5	1433.1	50	50	No	--	Yes

As determined using the Procedures specified in S10.1-10.13.

RECORDED BY: Nathaniel Newth DATE: July 18, 2011

APPROVED BY: Helen A. Kaleto

3.0 TEST DATA (Including Acceleration and Velocity Plots)




mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT AP1
H/V IMPACT ANGLE= 250 / 50
U11344
POST TEST


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT AP1
H/V IMPACT ANGLE= 250 / 50
U11344
POST TEST


FH1-REL
FH1
AP1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Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT AP1
H/V IMPACT ANGLE= 250 / 50
U11344
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Target (Vehicle Side): AP1Left

MGA Test Reference No.:U11344

Approach Horizontal Angles:250º

Approach Vertical Angles:50º

Additional Description:2 relocations

Test Number:#2

Temperature:22.6C

Humidity:63.6%

Time of Test:11:55:54 AM

FMH Serial No:[037]

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
859	919	3.7	23.5	6	24 Right

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J32177	-113.7	1.07	1.07
Y	6	J14103	93.9	0.85	0.85
Z	7	J35800	97.8	0.94	0.94

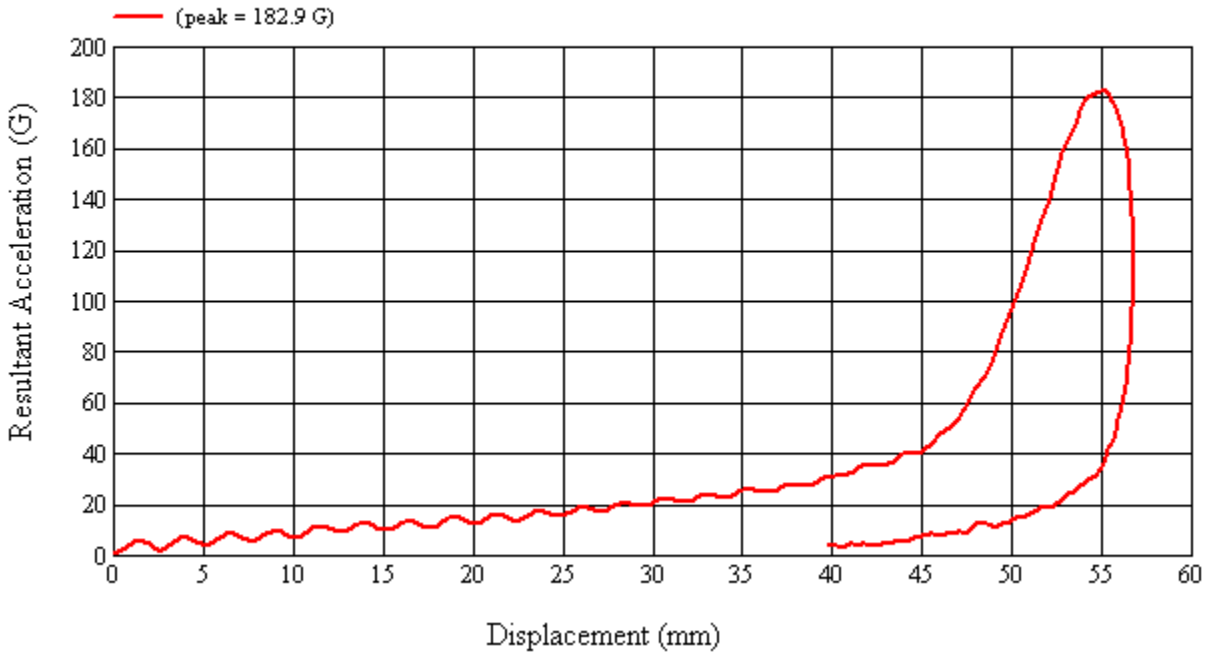
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

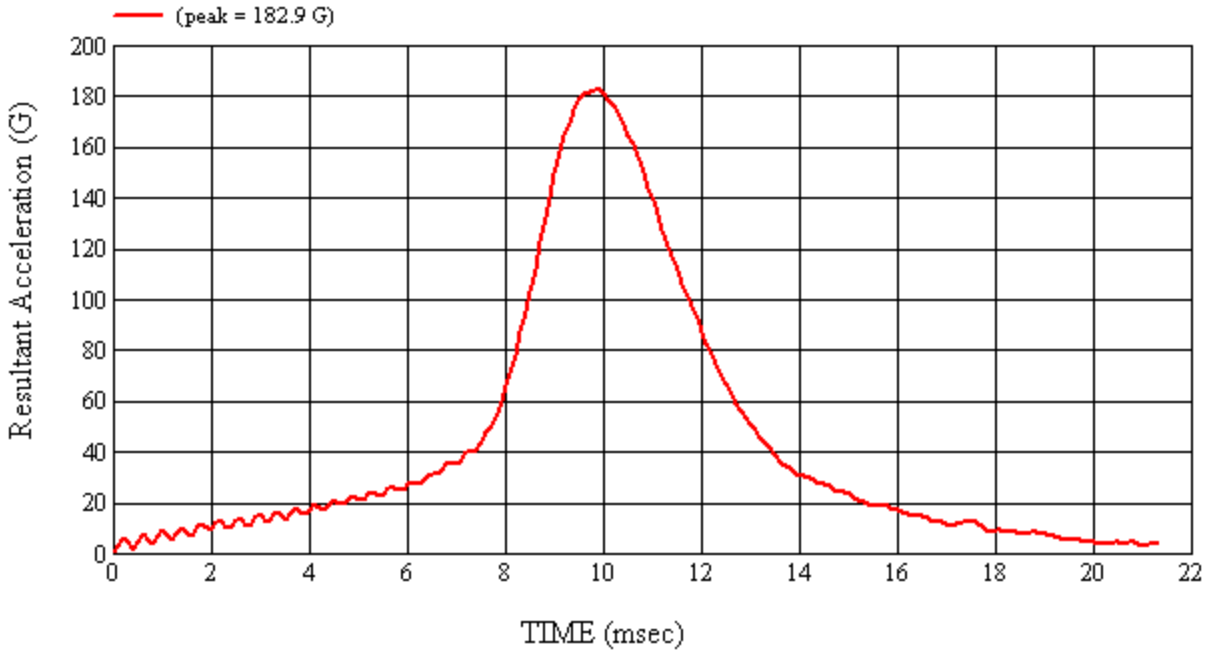
Headliner deformation

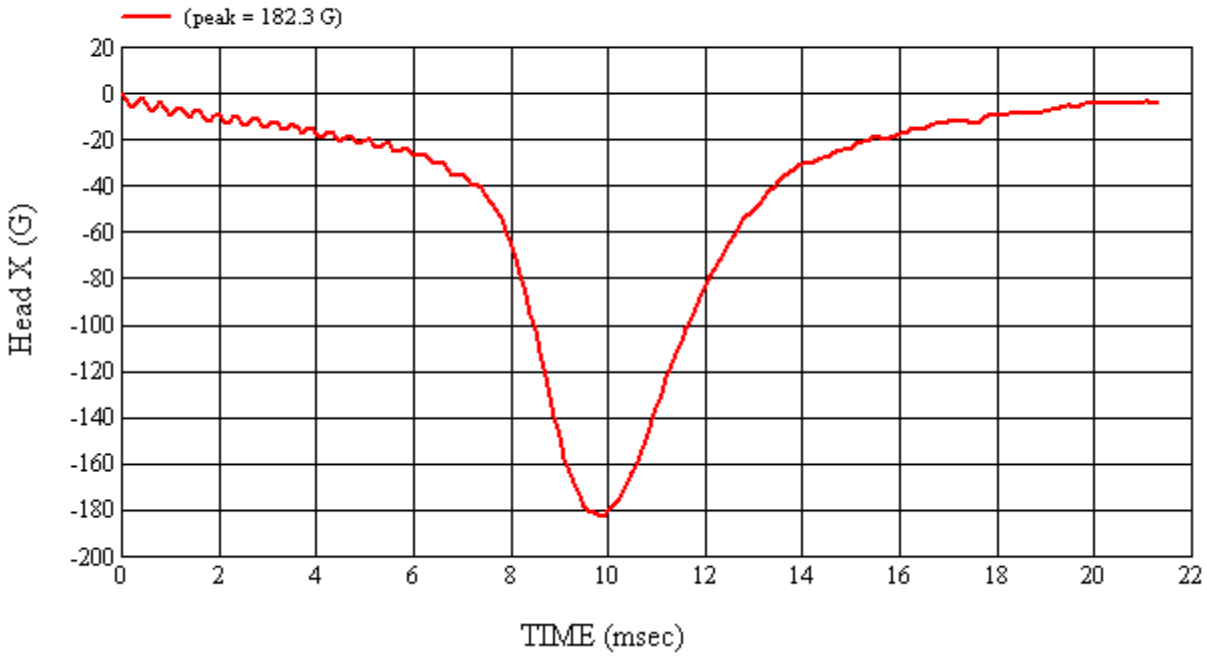
Recorded By: _____ Approved By*: _____ Date: 7/28/2011

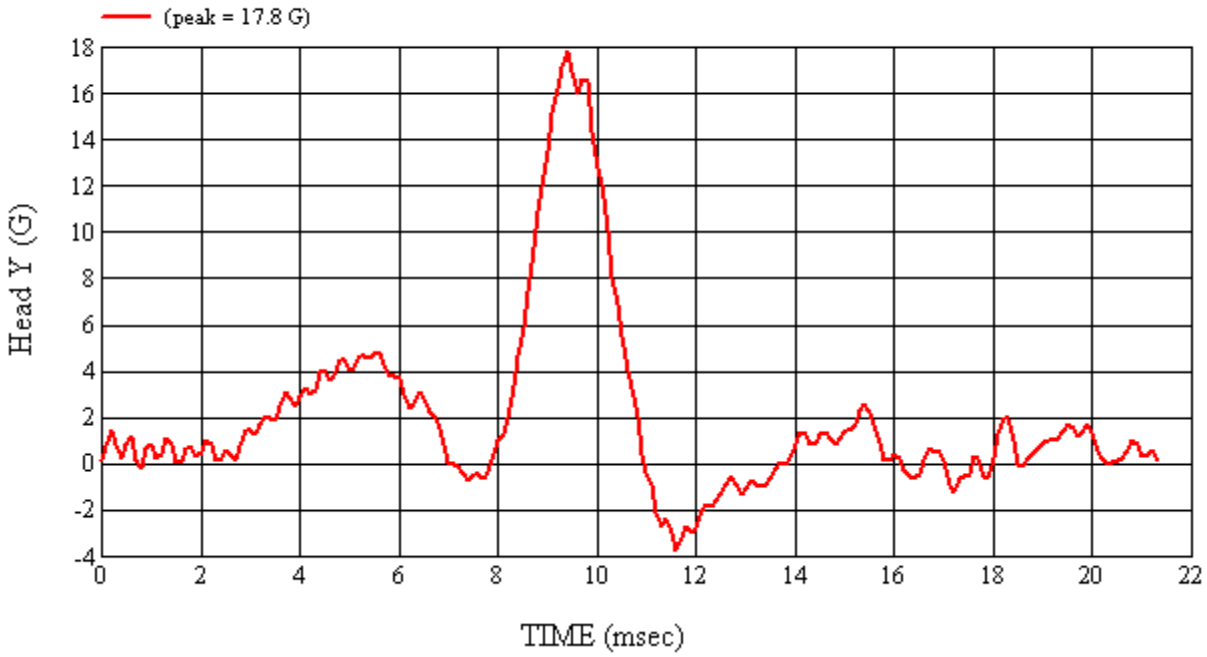
*Only necessary for NHTSA (Government) Compliance testing.

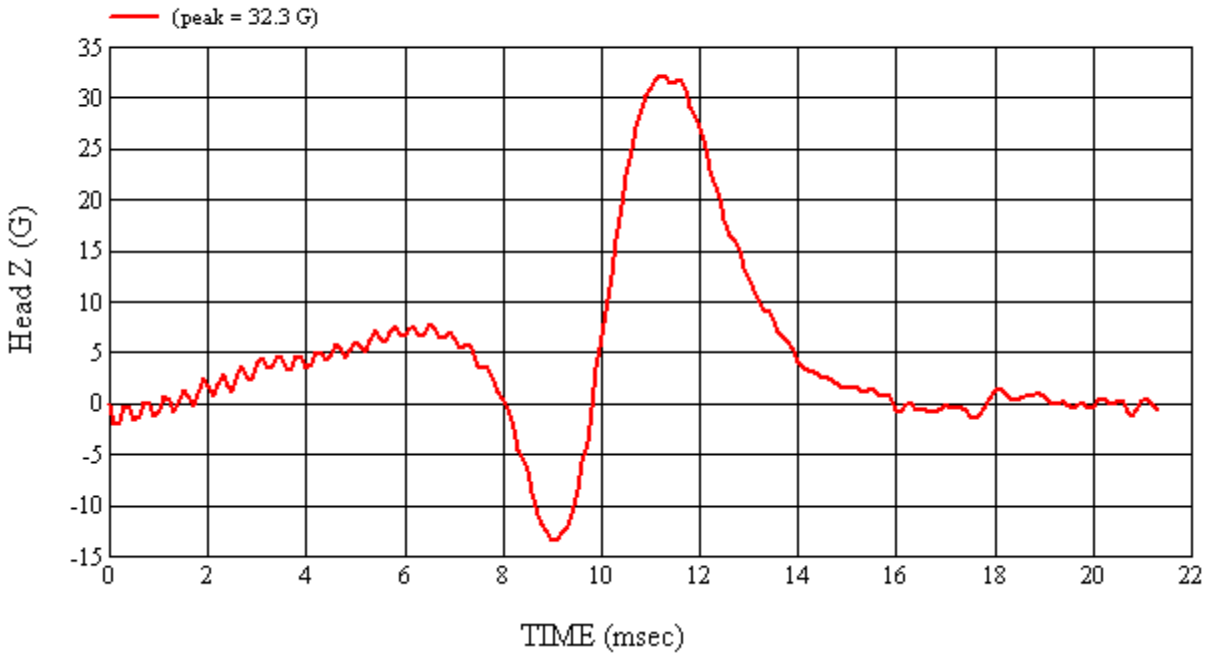
MGA Test #: U11344 Target Location: AP1, Left Side Test Date: 7/28/2011

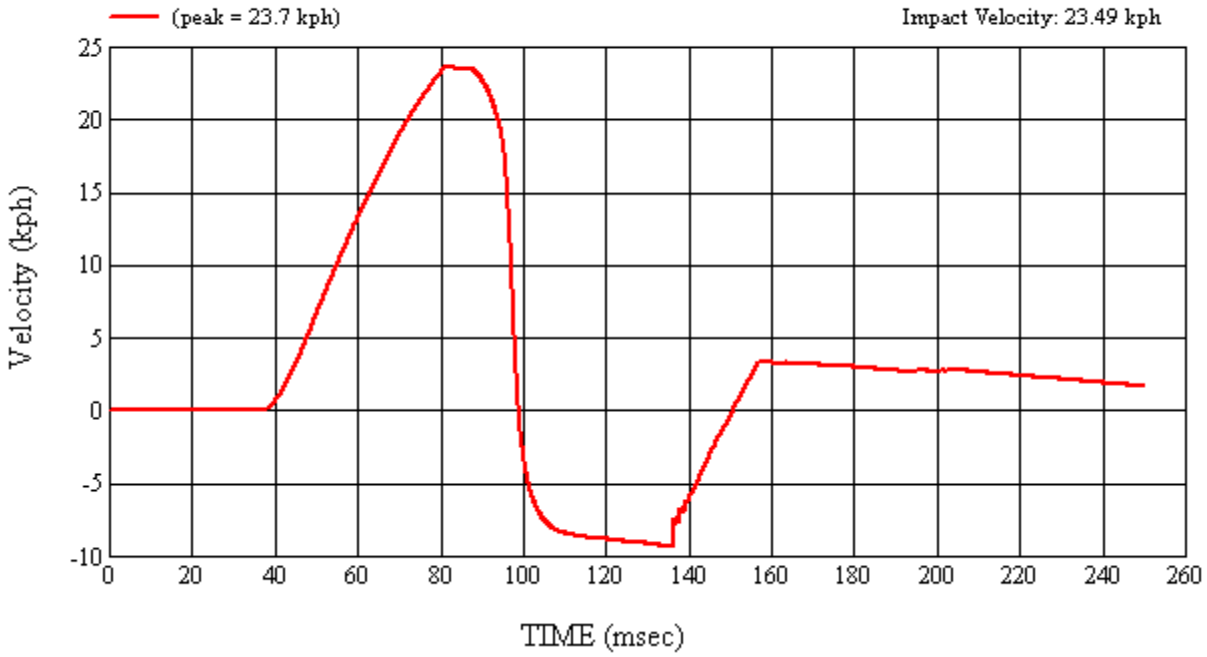


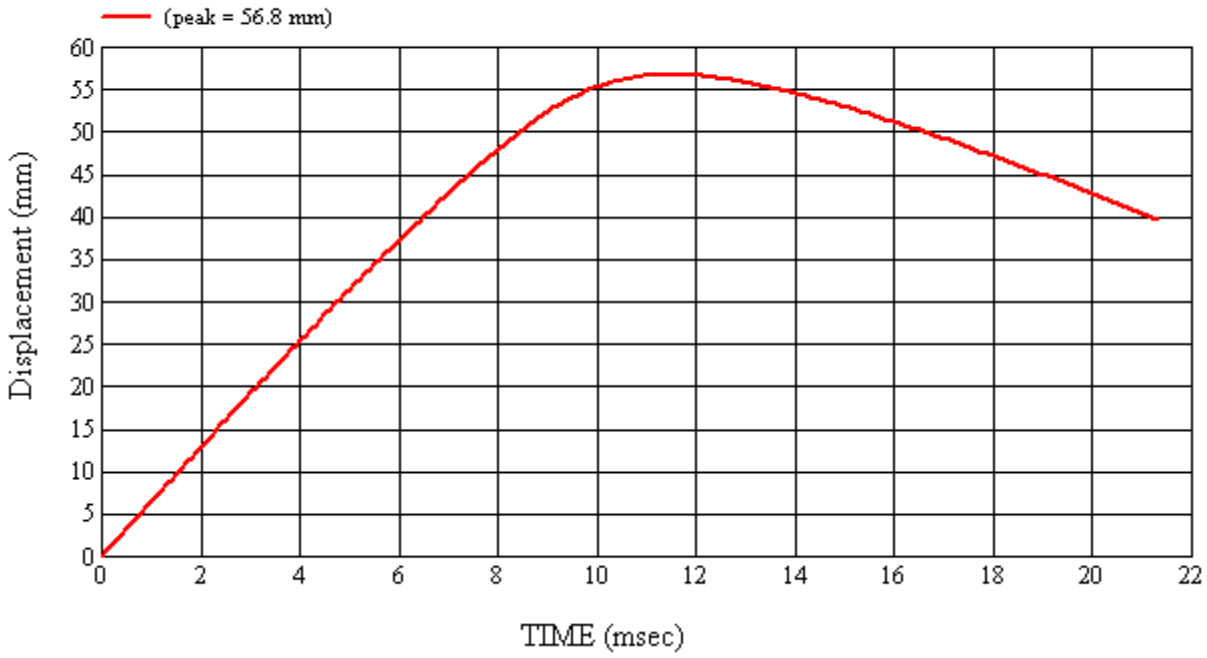



(peak = 182.3 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 17.8 G)
Head Y (G)
18
16
14
12
10
8
6
4
2
0
-2
-4
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 32.3 G)
Head Z (G)
35
30
25
20
15
10
5
0
-5
-10
-15
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 23.7 kph)
Impact Velocity: 23.49 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 56.8 mm)
Displacement (mm)
60
55
50
45
40
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT AP2
H/V IMPACT ANGLE= 153 / 10
U11354
PRE TEST


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT AP2
H/V IMPACT ANGLE= 153 / 10
U11354
PRE TEST


mga
Impact Testing
G11I7-001.14
7/29/2011
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT AP2
H/V IMPACT ANGLE= 153 / 10
U11354
POST TEST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7/29/2011
Impact Testing
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT AP2
H/V IMPACT ANGLE= 153 / 10
U11354
POST TEST


AP1
AP2
AP3


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT AP2
H/V IMPACT ANGLE= 153 / 10
U11354
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Test Number:#12

Target (Vehicle Side): AP2Right

Temperature:24.2C

MGA Test Reference No.:U11354

Humidity:60.1%

Approach Horizontal Angles:153º

Time of Test:6:03:33 PM

Approach Vertical Angles:10º

FMH Serial No:[038]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
493	433	7.4	23.6	36	2 Right

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-96.4	1.07	1.07
Y	6	J36197	108.7	0.85	0.85
Z	7	J36353	99.1	0.94	0.94

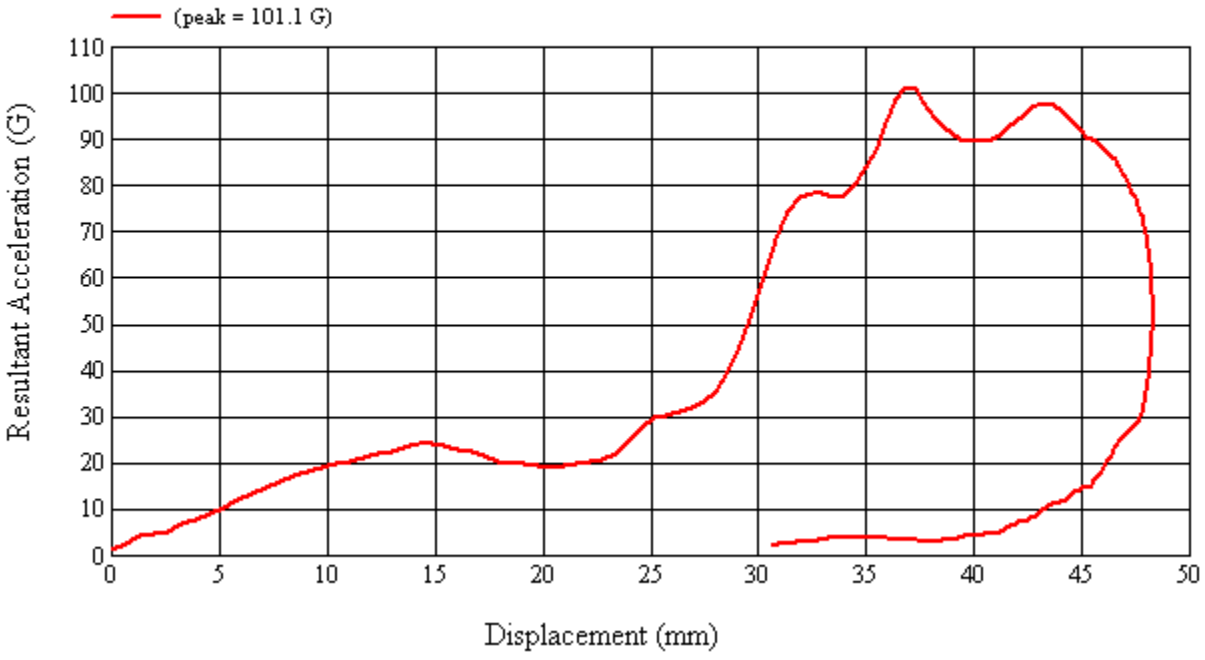
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

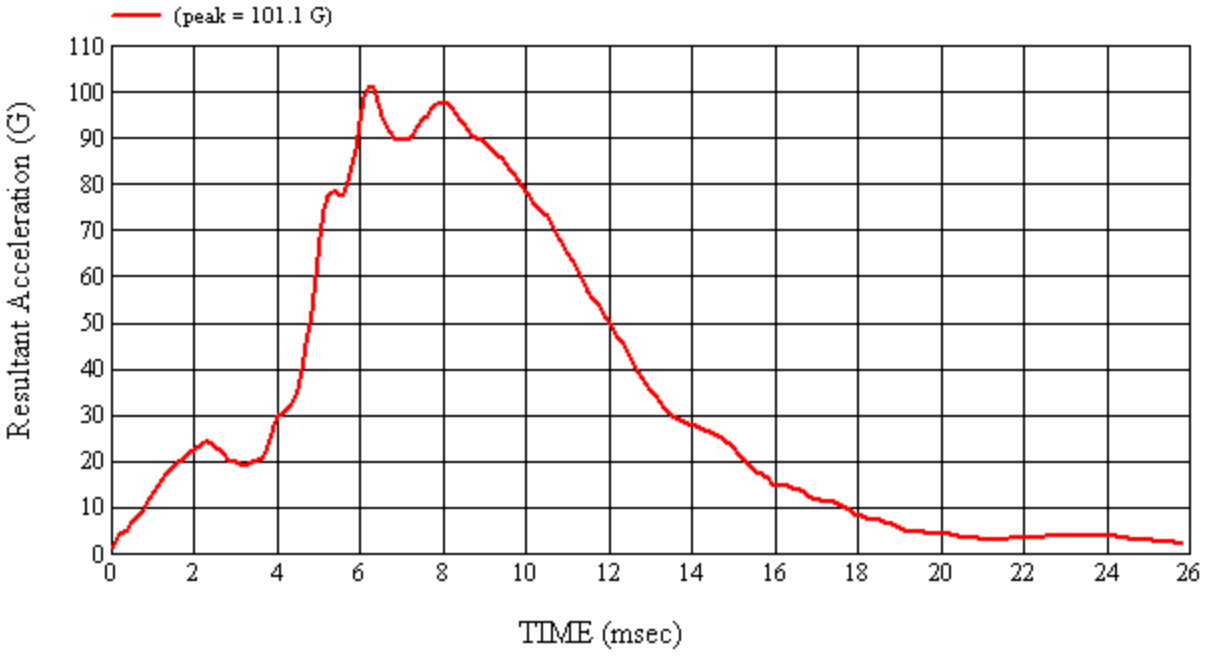
Dislodged trim

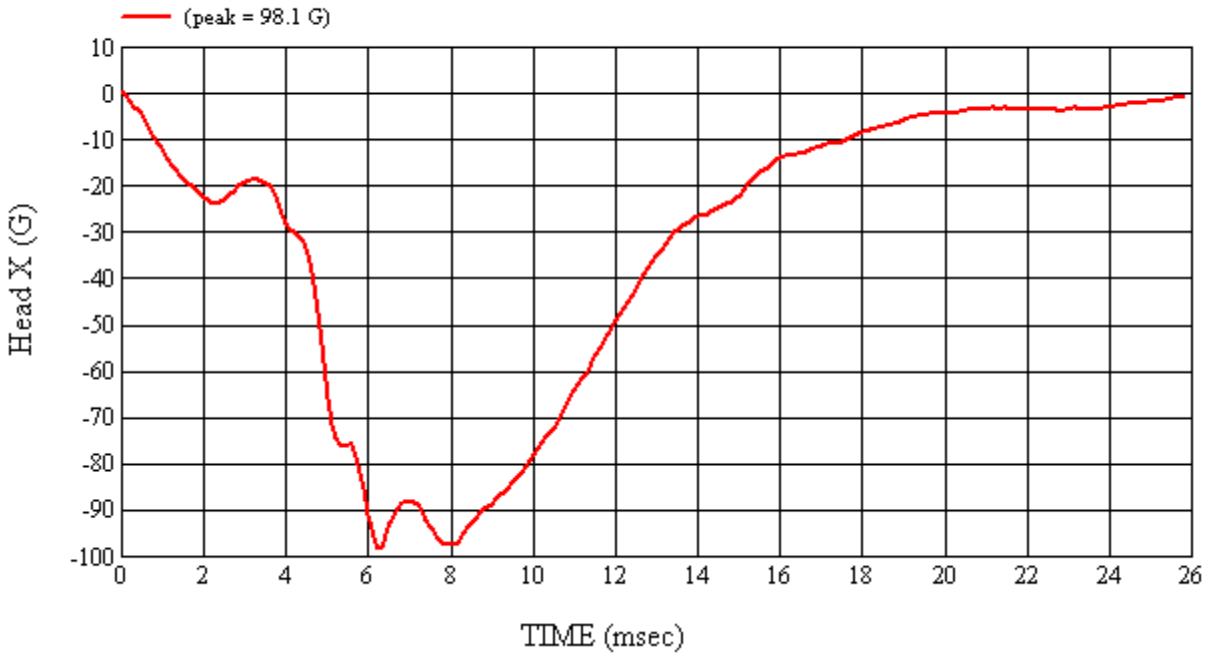
Recorded By: _____ Approved By*: _____ Date: 7/29/2011

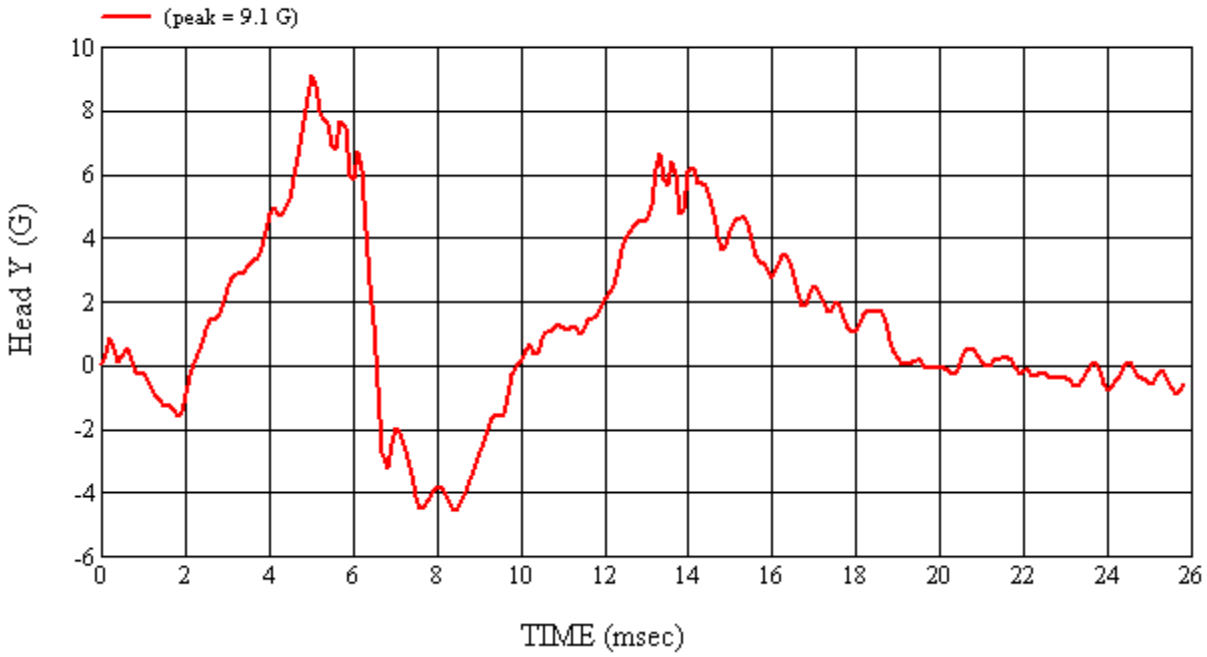
*Only necessary for NHTSA (Government) Compliance testing.

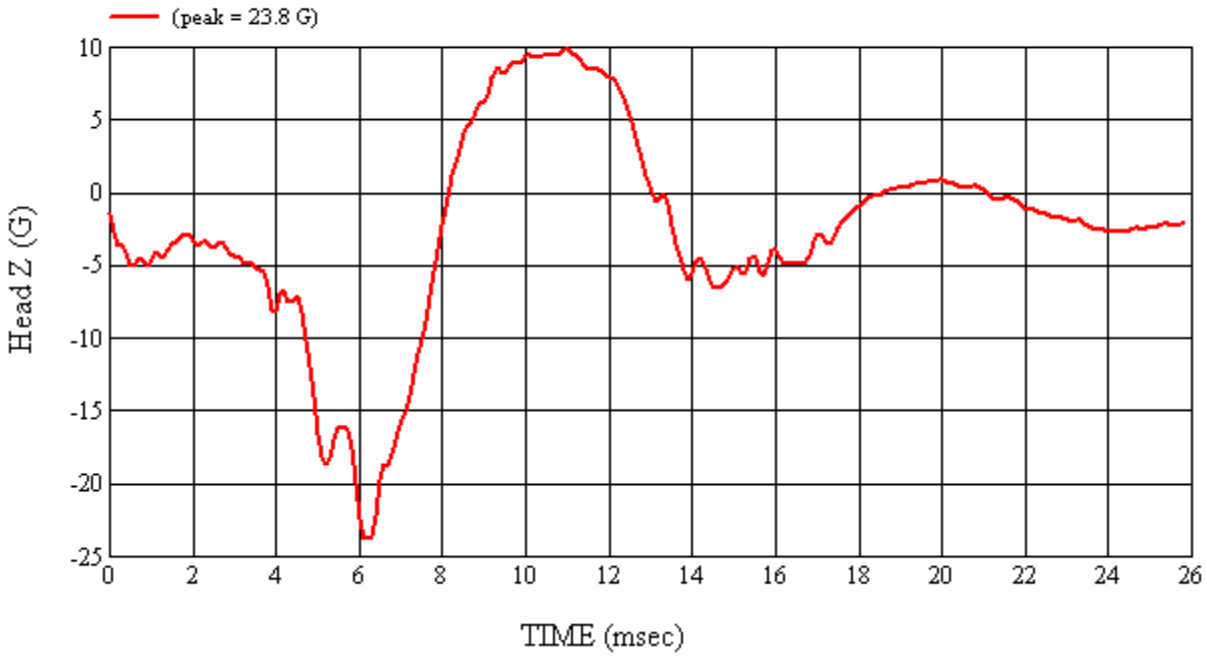
MGA Test #: U11354 Target Location: AP2, Right Side Test Date: 7/29/2011

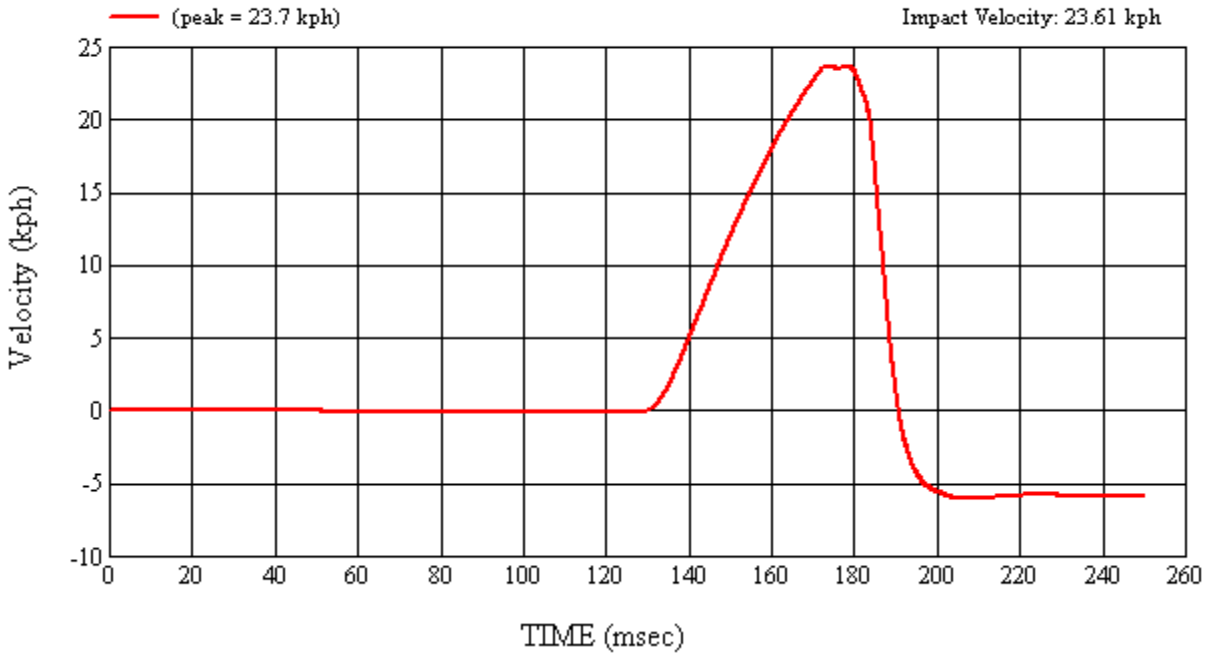


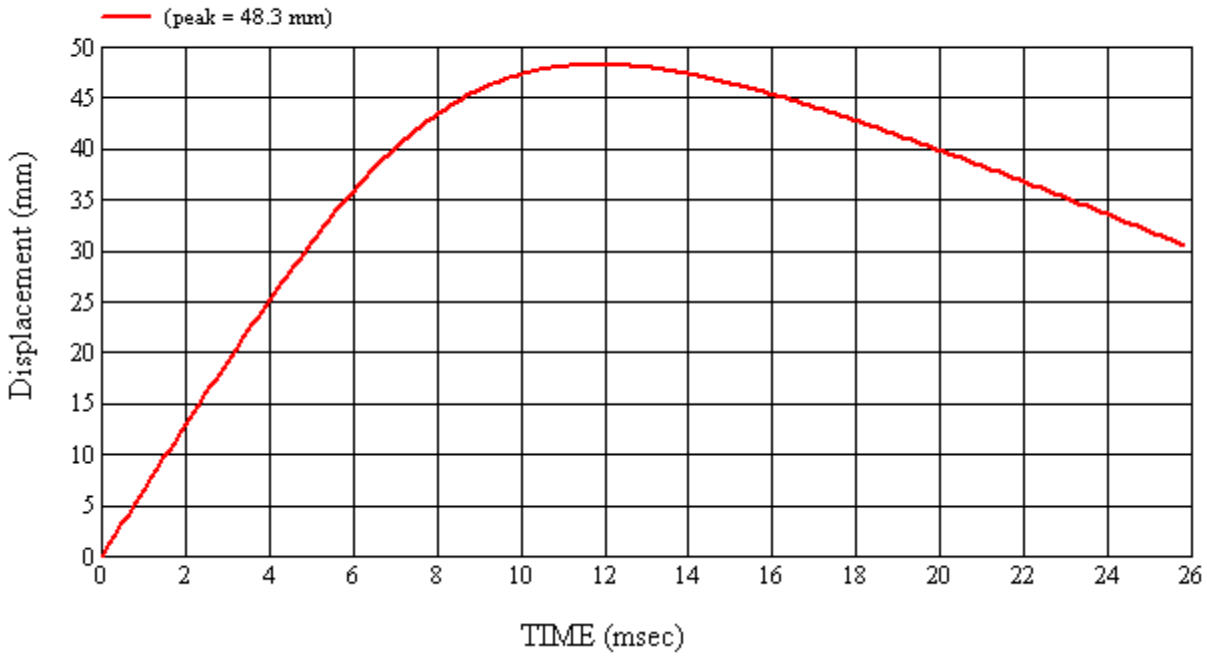



(peak = 98.1 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)

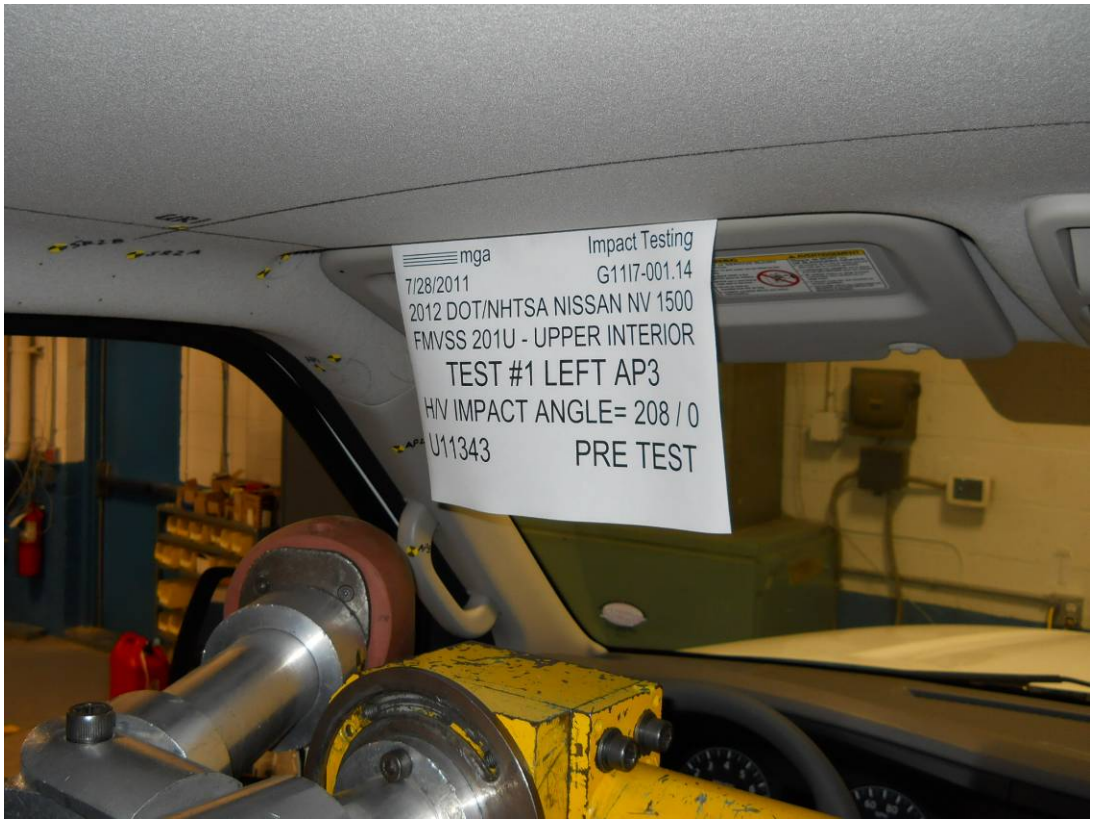

(peak = 9.1 G)
Head Y (G)
10
8
6
4
2
0
-2
-4
-6
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)

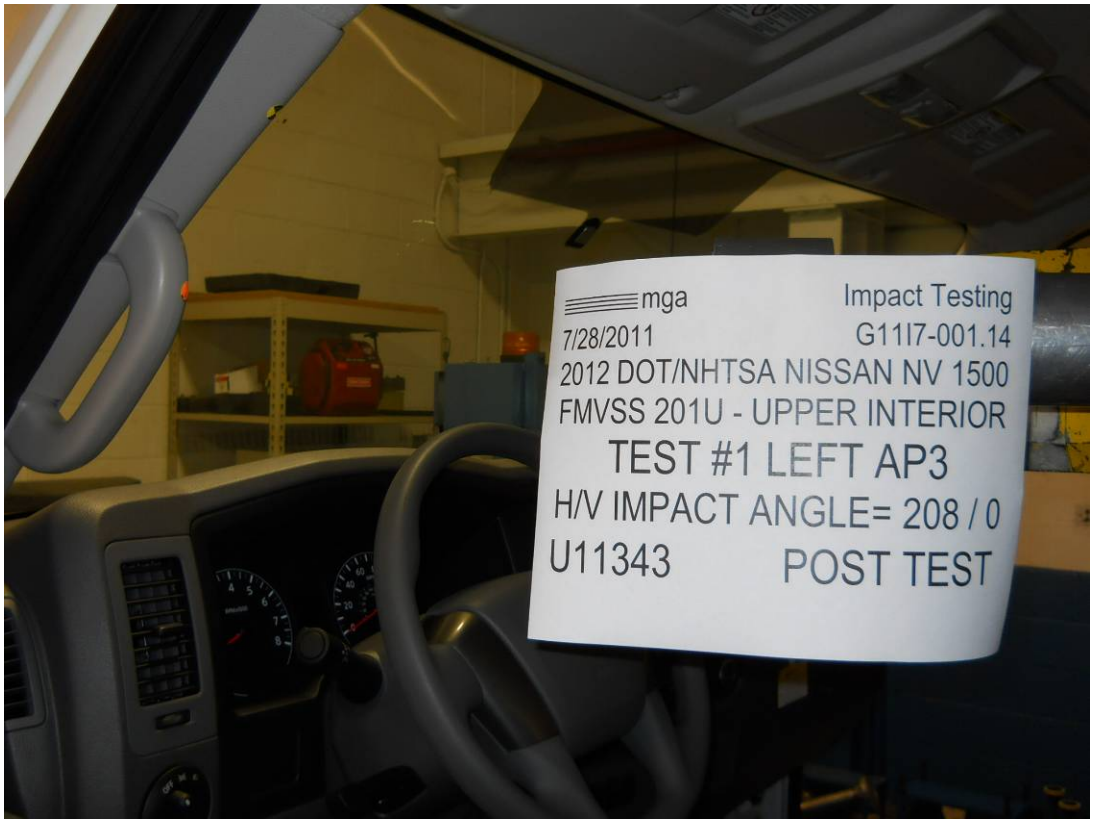

(peak = 23.8 G)
Head Z (G)
10
5
0
-5
-10
-15
-20
-25
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


(peak = 23.7 kph)
Impact Velocity: 23.61 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)

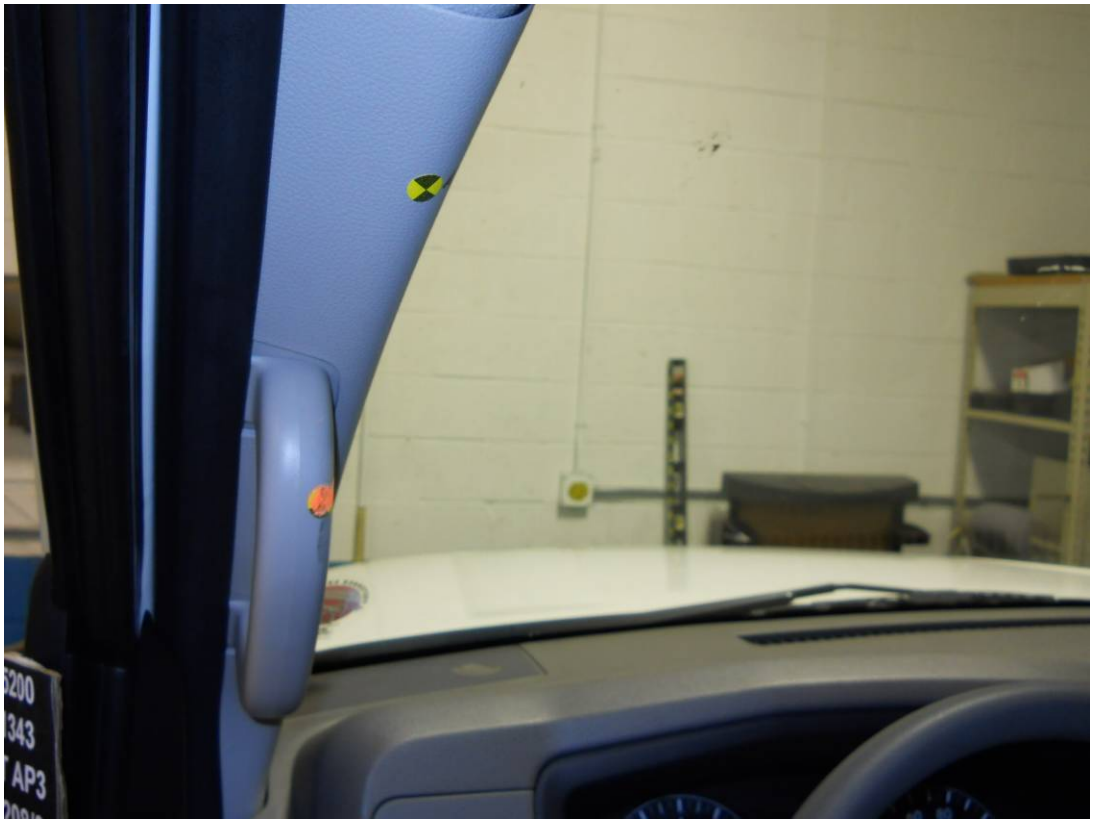

(peak = 48.3 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
50
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


mga
Impact Testing
G11I7-001.14
7/28/2011
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT AP3
H/V IMPACT ANGLE= 208 / 0
U11343
PRE TEST
CC5200
U11343
LEFT AP3
H/V 208/0


mga
Impact Testing
G11I7-001.14
7/28/2011
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT AP3
H/V IMPACT ANGLE= 208 / 0
U11343
PRE TEST


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT AP3
H/V IMPACT ANGLE= 208 / 0
U11343
POST TEST


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT AP3
H/V IMPACT ANGLE= 208 / 0
U11343
POST TEST

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Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT AP3
H/V IMPACT ANGLE= 208 / 0
U11343
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Test Number:#1

Target (Vehicle Side): AP3Left

Temperature:22.2C

MGA Test Reference No.:U11343

Humidity:65.0%

Approach Horizontal Angles:208º

Time of Test:10:23:35 AM

Approach Vertical Angles:0º

FMH Serial No:[035]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
570	535	7.4	23.4	9	2 Right

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-95.8	1.07	1.07
Y	6	J22664	94.2	0.85	0.85
Z	7	J35924	92.8	0.94	0.94

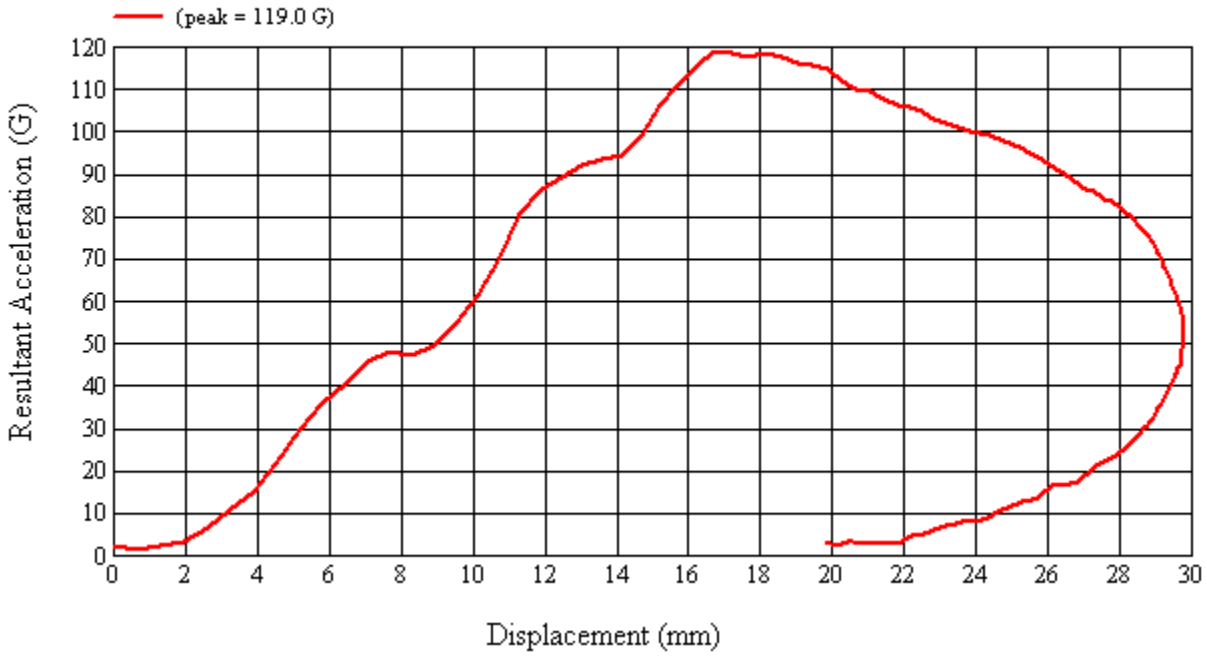
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

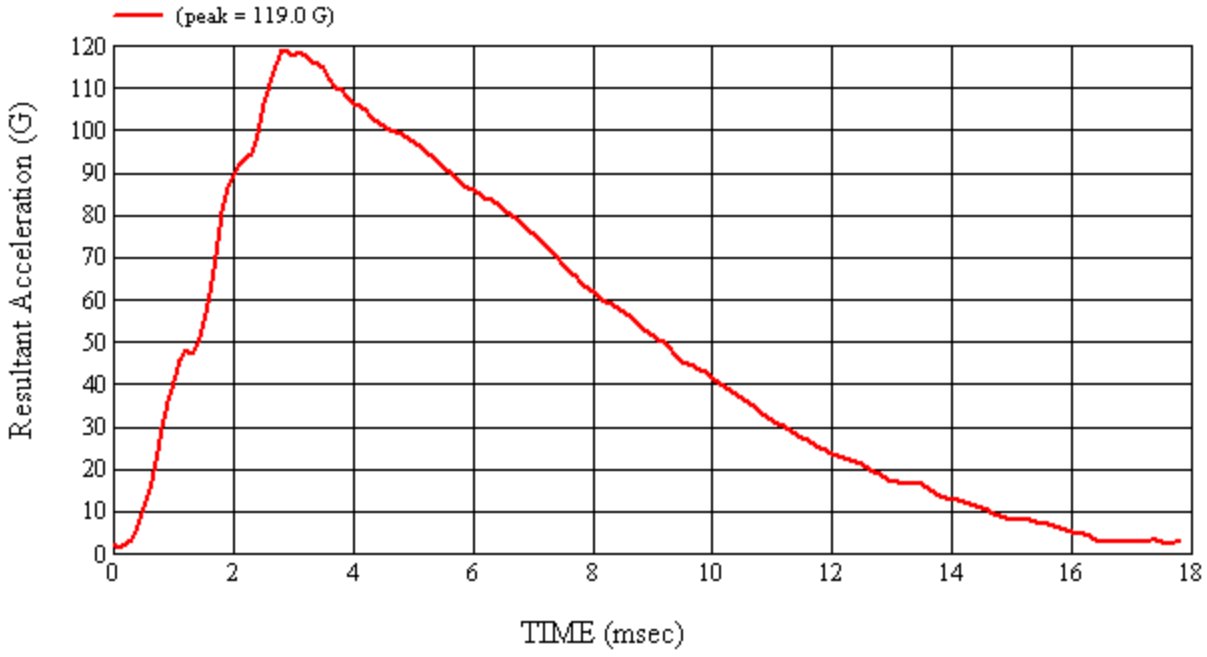
No visible damage

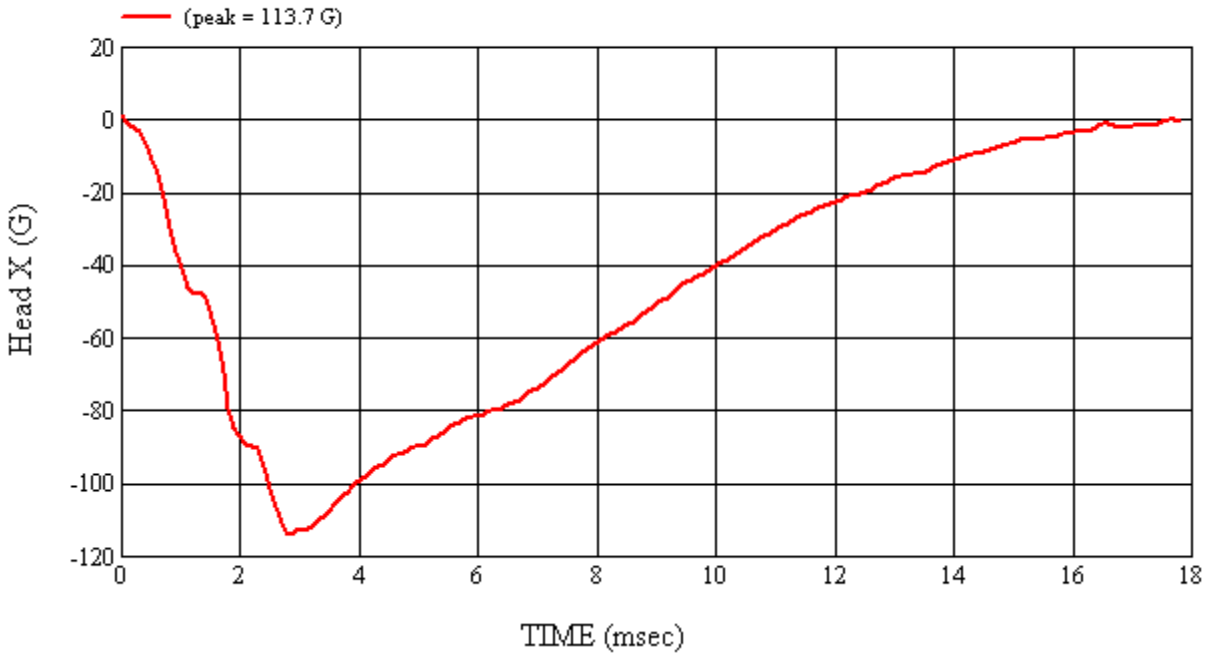
Recorded By: _____ Approved By*: _____ Date: 7/28/2011

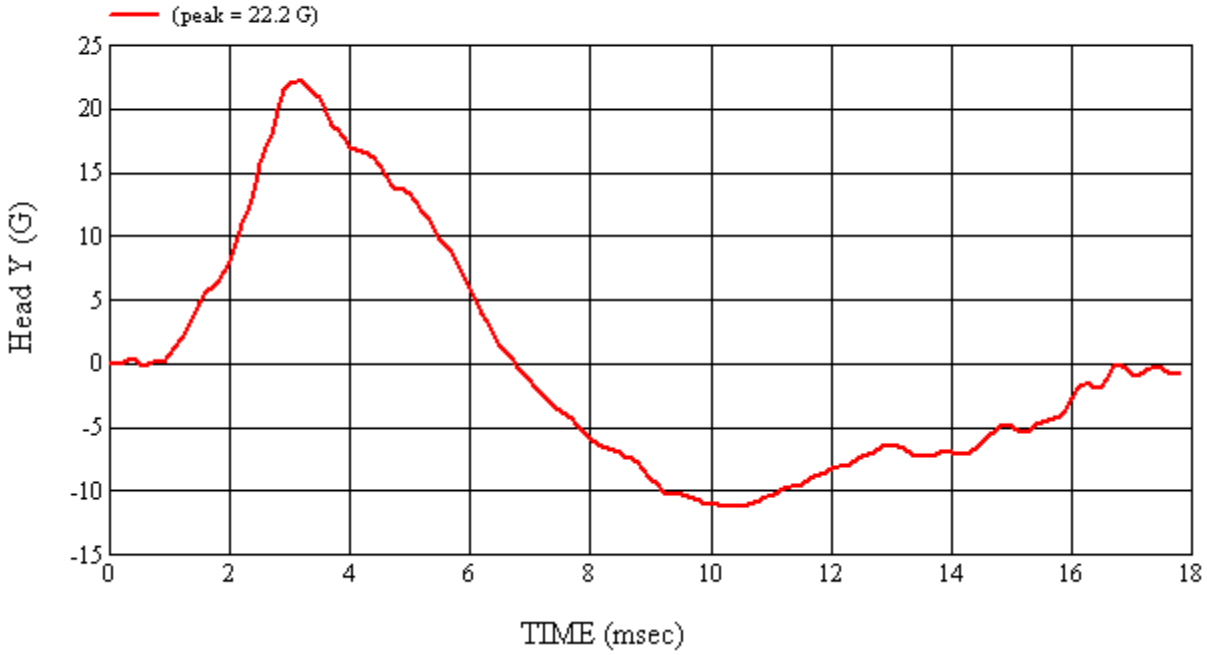
*Only necessary for NHTSA (Government) Compliance testing.

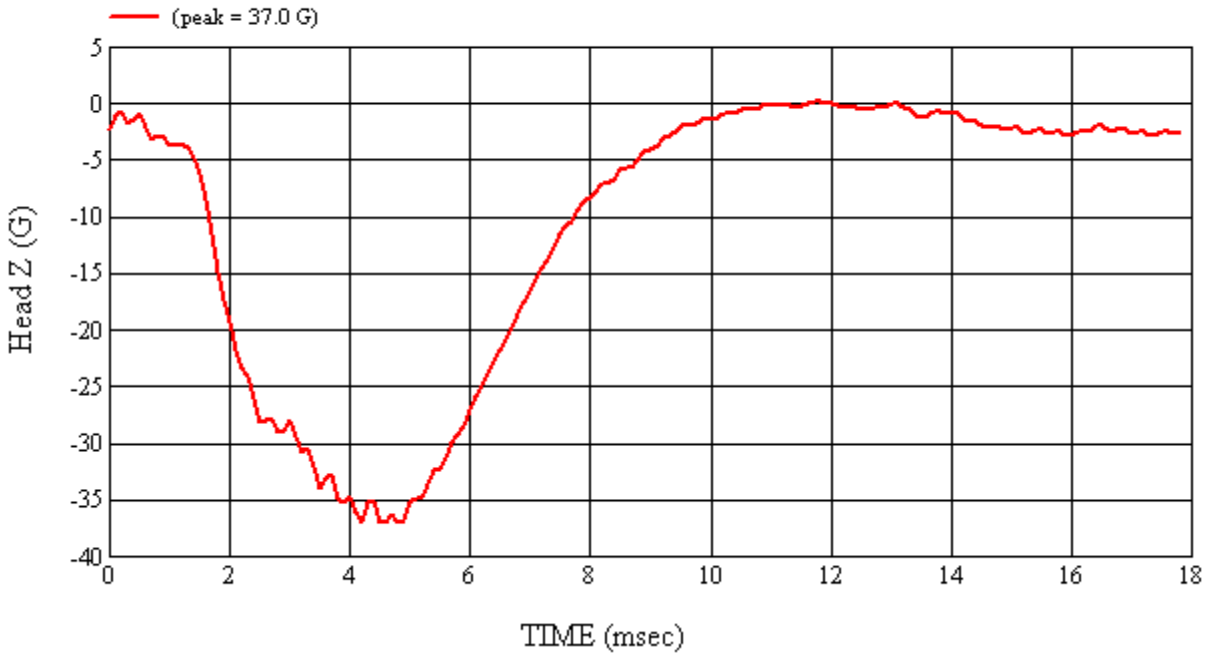
MGA Test #: U11343 Target Location: AP3, Left Side Test Date: 7/28/2011

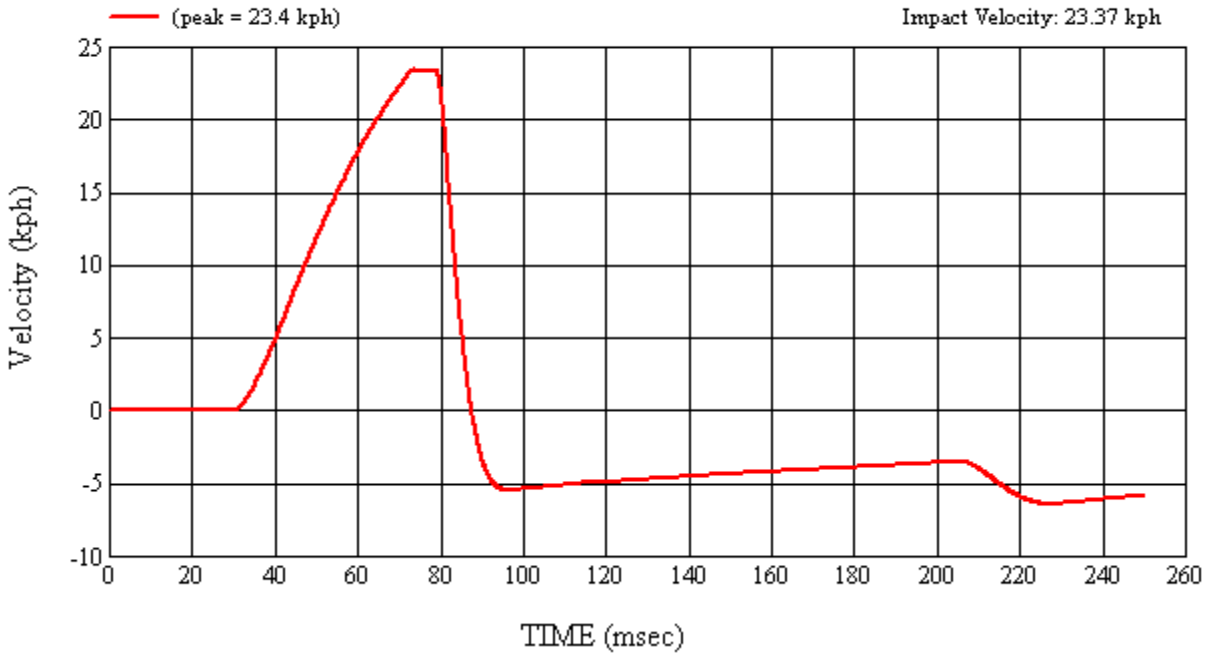


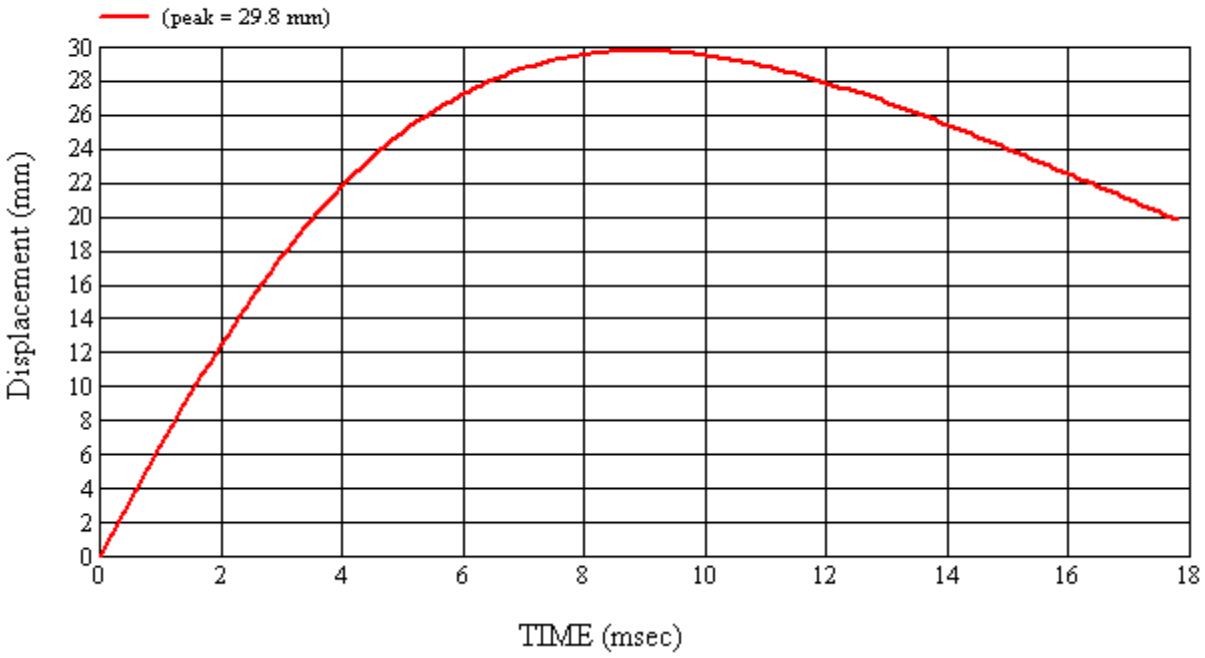


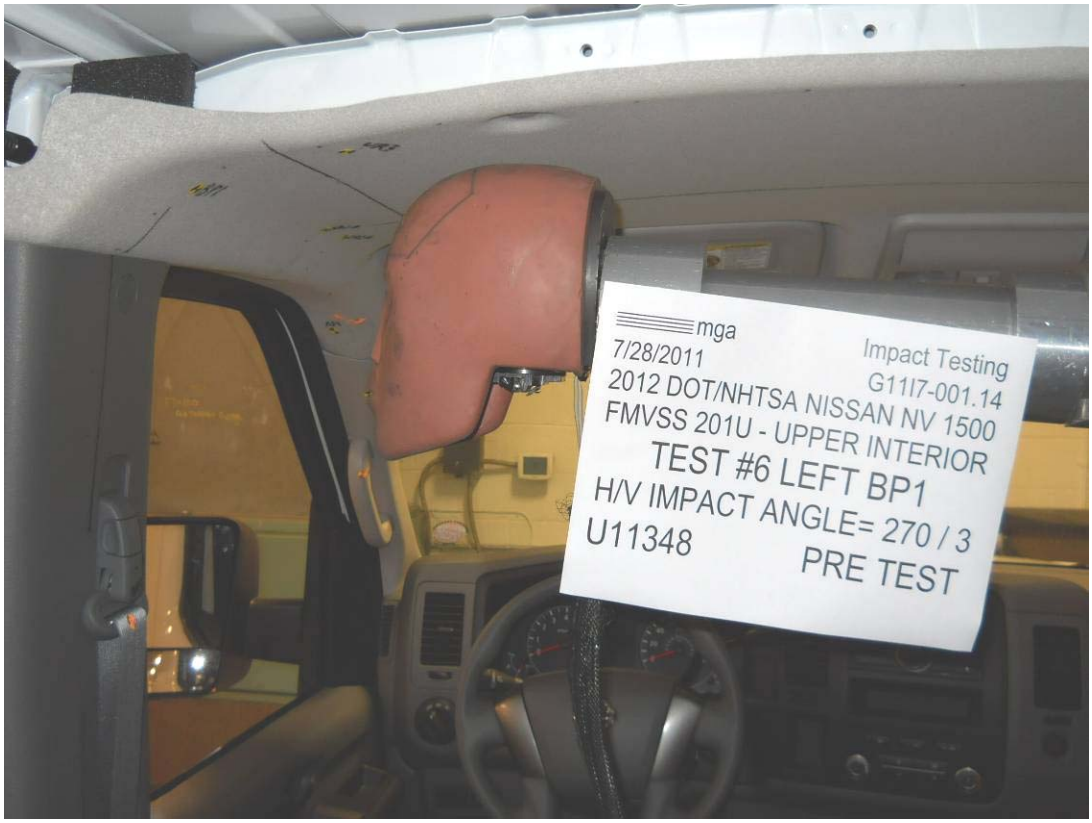

(peak = 113.7 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 22.2 G)
Head Y (G)
25
20
15
10
5
0
-5
-10
-15
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 37.0 G)
Head Z (G)
5
0
-5
-10
-15
-20
-25
-30
-35
-40
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 23.4 kph)
Impact Velocity: 23.37 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 29.8 mm)
Displacement (mm)
TIME (msec)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT BP1
H/V IMPACT ANGLE= 270 / 3
U11348
PRE TEST


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT BP1
H/V IMPACT ANGLE= 270 / 3
U11348
PRE TEST
UR3
BP1


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT BP1
H/V IMPACT ANGLE= 270 / 3
U11348
POST TEST


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT BP1
H/V IMPACT ANGLE= 270 / 3
U11348
POST TEST
BP1


BP1


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #6 LEFT BP1
H/V IMPACT ANGLE= 270 / 3
U11348
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Test Number:#6

Target (Vehicle Side): BP1Left

Temperature:23.5C

MGA Test Reference No.:U11348

Humidity:67.1%

Approach Horizontal Angles:270º

Time of Test:5:01:15 PM

Approach Vertical Angles:3º

FMH Serial No:[038]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
512	458	12.6	23.8	71	2 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-96.4	1.07	1.07
Y	6	J36197	108.7	0.85	0.85
Z	7	J36353	99.1	0.94	0.94

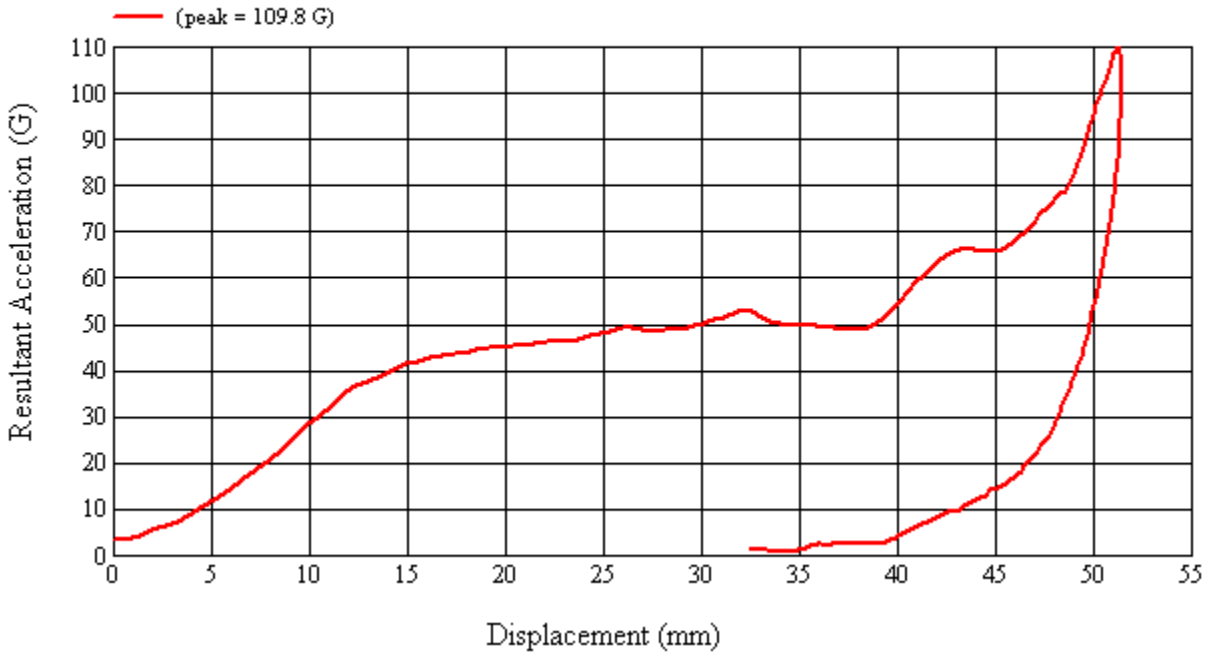
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

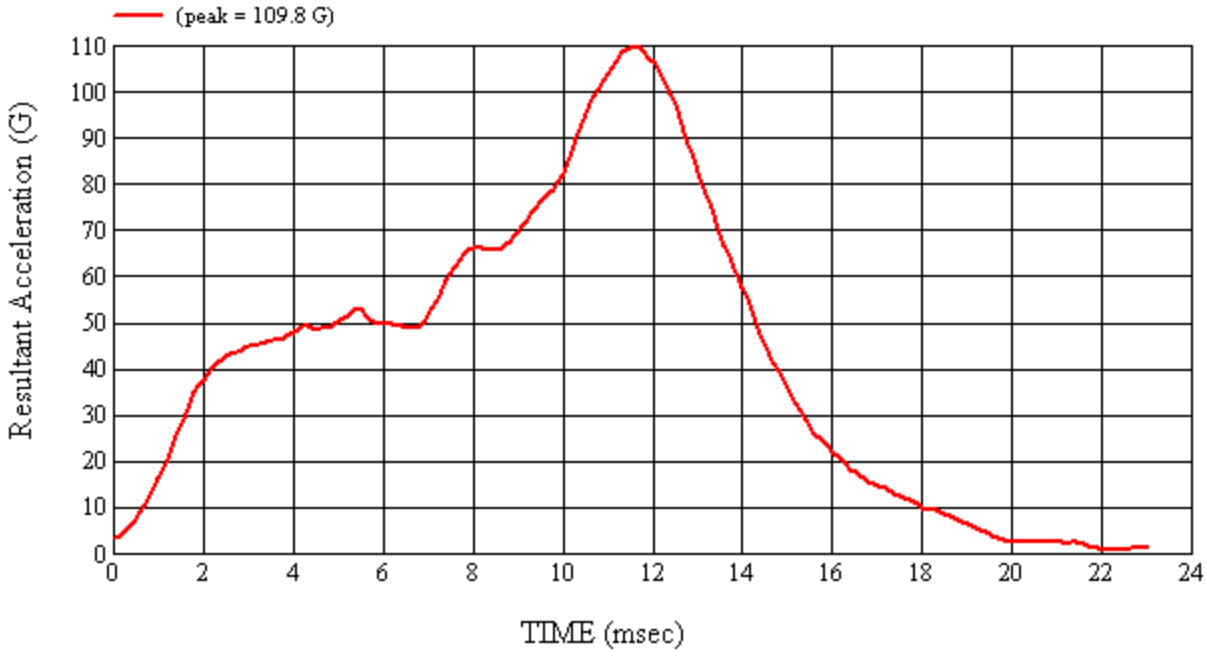
No visible damage

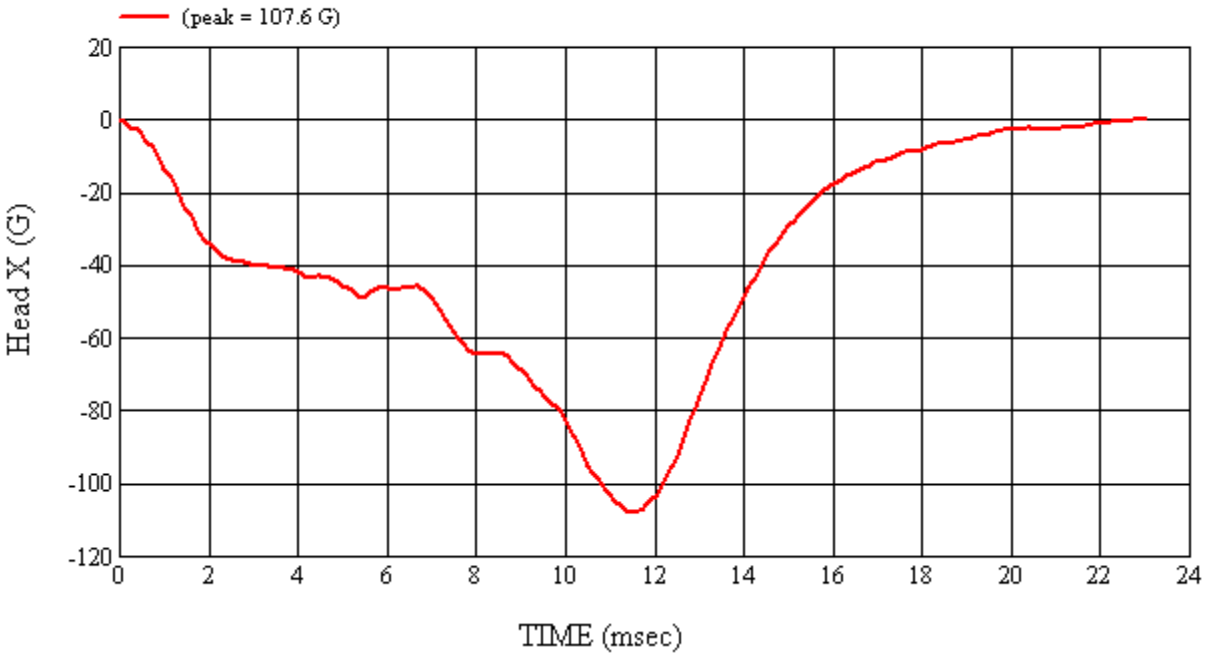
Recorded By: _____ Approved By*: _____ Date: 7/28/2011

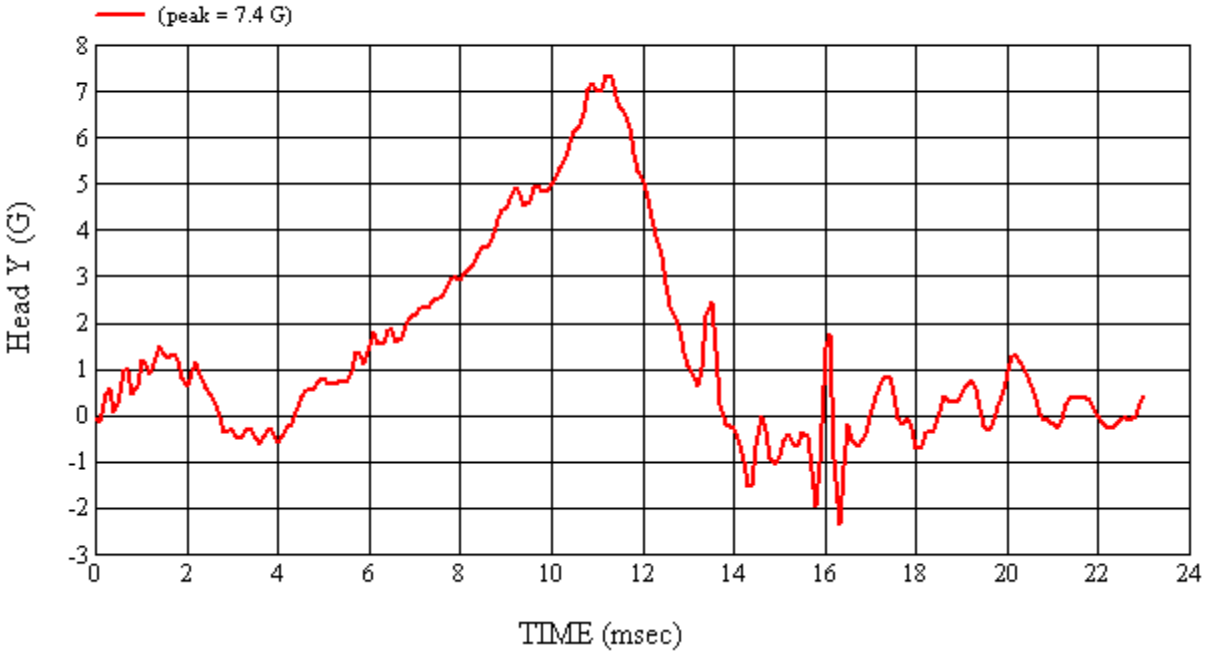
*Only necessary for NHTSA (Government) Compliance testing.

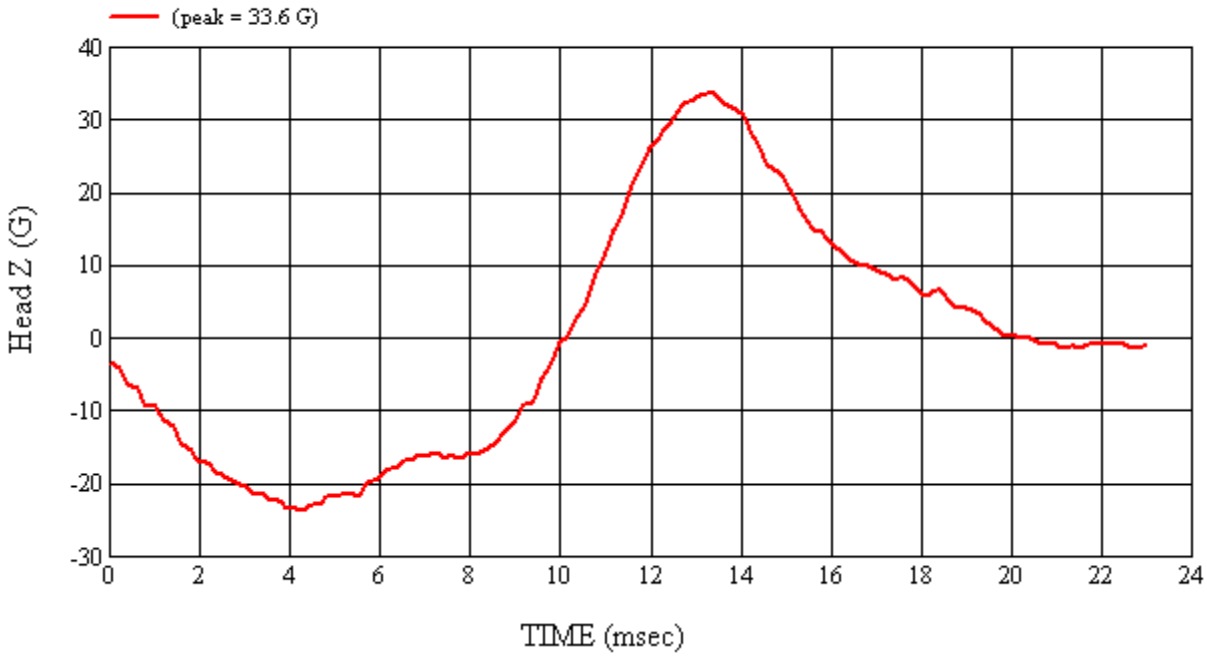
MGA Test #: U11348 Target Location: BP1, Left Side Test Date: 7/28/2011

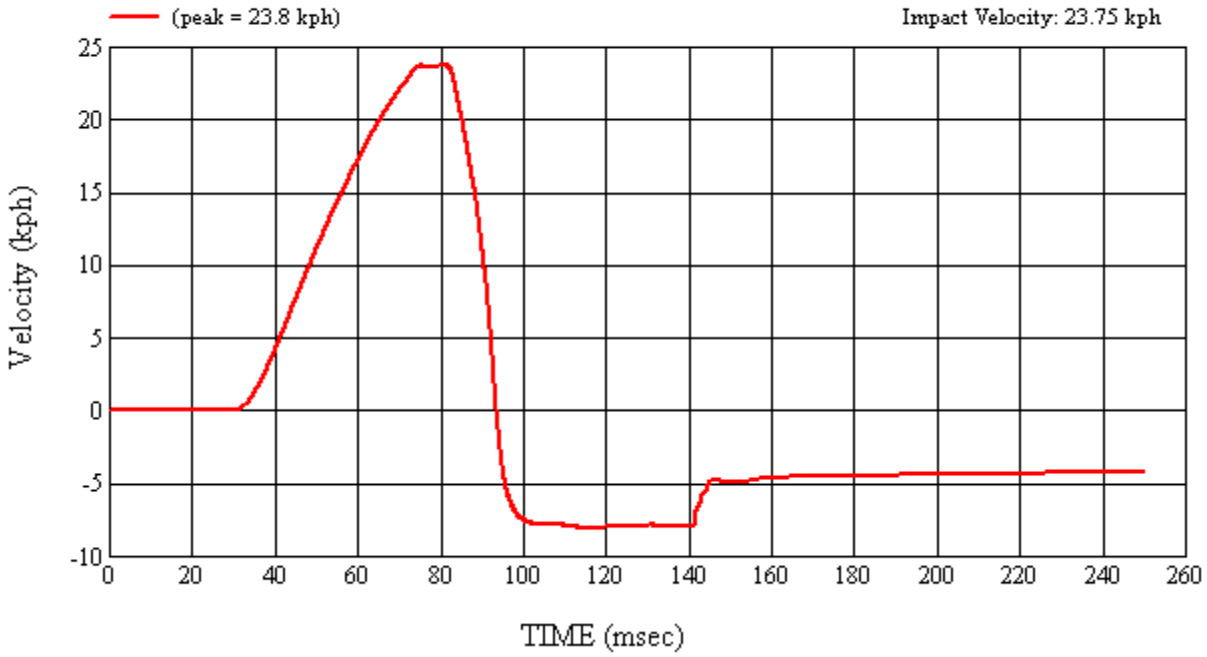


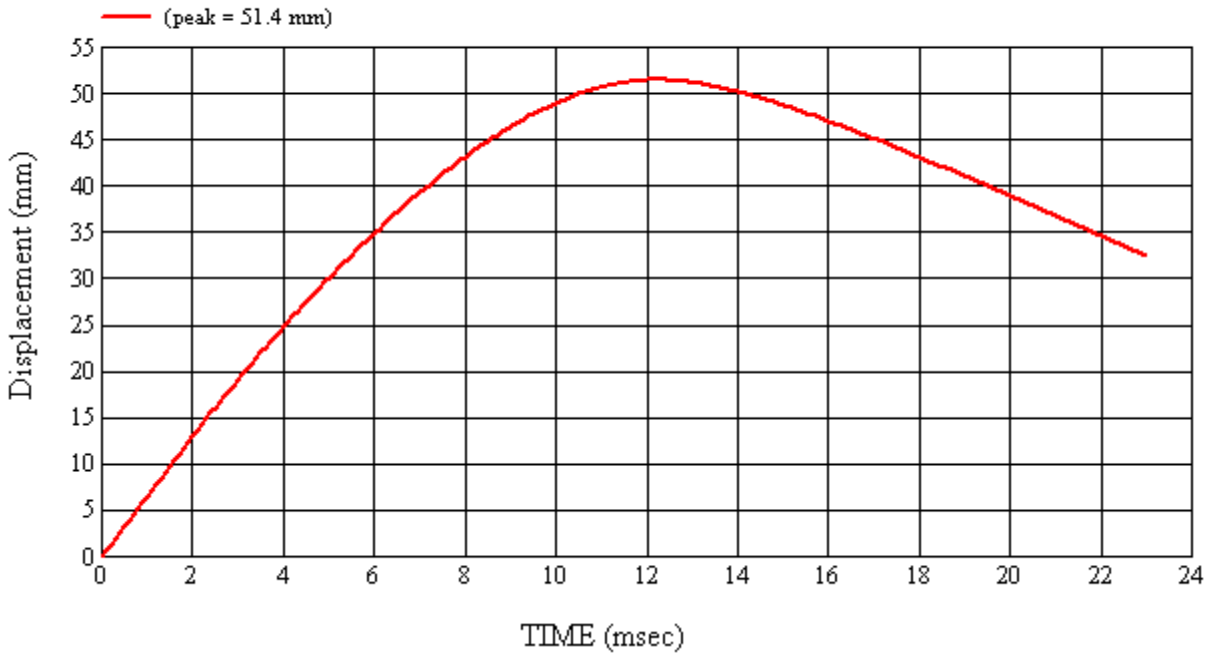


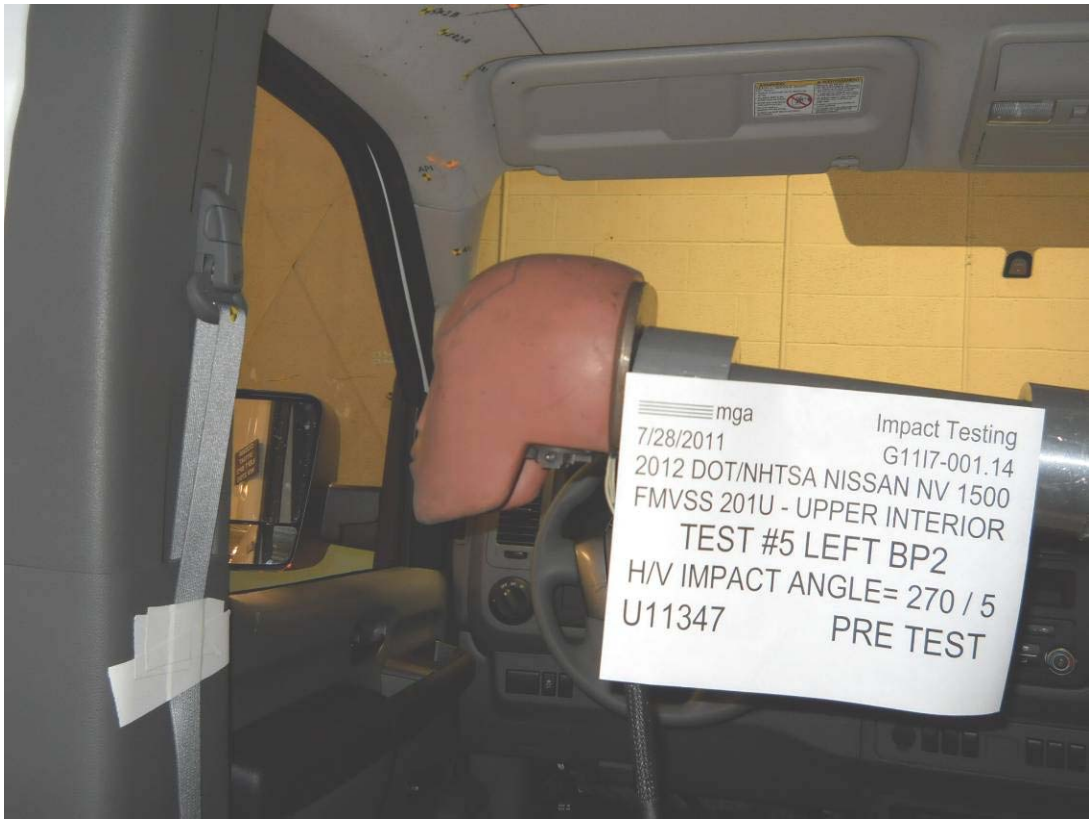

(peak = 107.6 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 7.4 G)
Head Y (G)
8
7
6
5
4
3
2
1
0
-1
-2
-3
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 33.6 G)
Head Z (G)
40
30
20
10
0
-10
-20
-30
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 23.8 kph)
Impact Velocity: 23.75 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 51.4 mm)
Displacement (mm)
55
50
45
40
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


mga
7/28/2011
Impact Testing
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT BP2
H/V IMPACT ANGLE= 270 / 5
U11347
PRE TEST


BP1
BP3
mga
7/28/2011
Impact Testing
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT BP2
H/V IMPACT ANGLE= 270 / 5
U11347
PRE TEST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Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT BP2
H/V IMPACT ANGLE= 270 / 5
U11347
POST TEST


BP1
mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT BP2
H/V IMPACT ANGLE= 270 / 5
U11347
POST TEST
BP3


BP3
BP2


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT BP2
H/V IMPACT ANGLE= 270 / 5
U11347
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Test Number:#5

Target (Vehicle Side): BP2Left

Temperature:23.2C

MGA Test Reference No.:U11347

Humidity:66.5%

Approach Horizontal Angles:270º

Time of Test:4:02:17 PM

Approach Vertical Angles:5º

FMH Serial No:[037]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
863	923	5.3	23.7	14	4 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J32177	-113.7	1.07	1.07
Y	6	J14103	93.9	0.85	0.85
Z	7	J35800	97.8	0.94	0.94

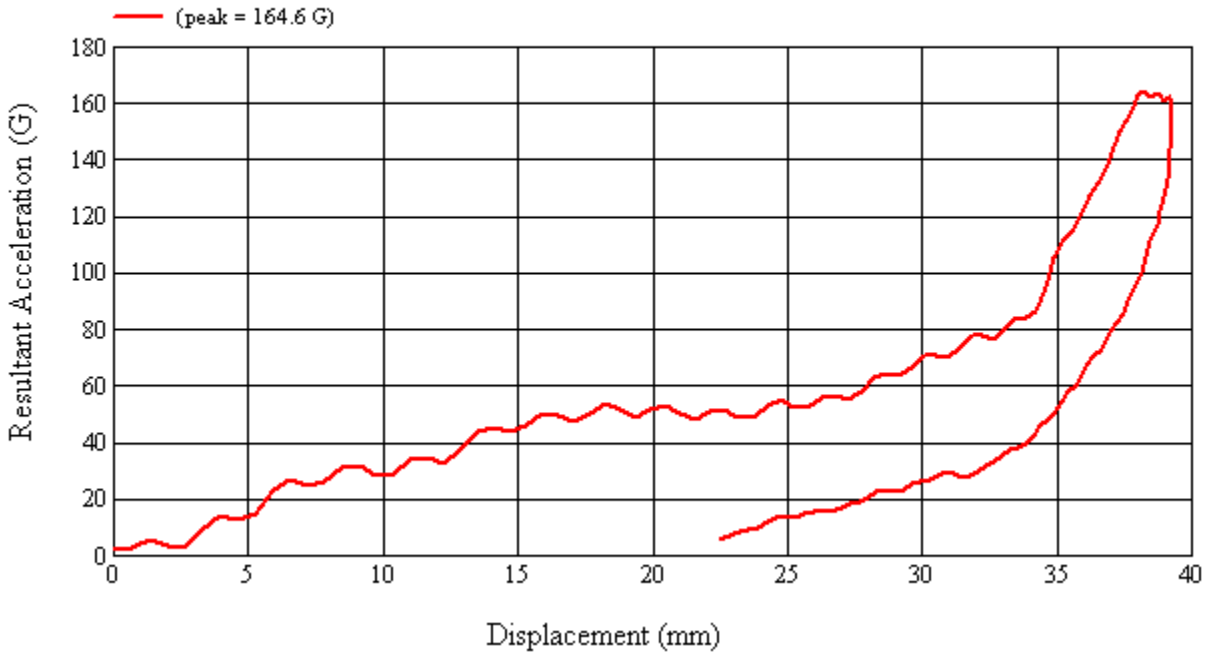
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

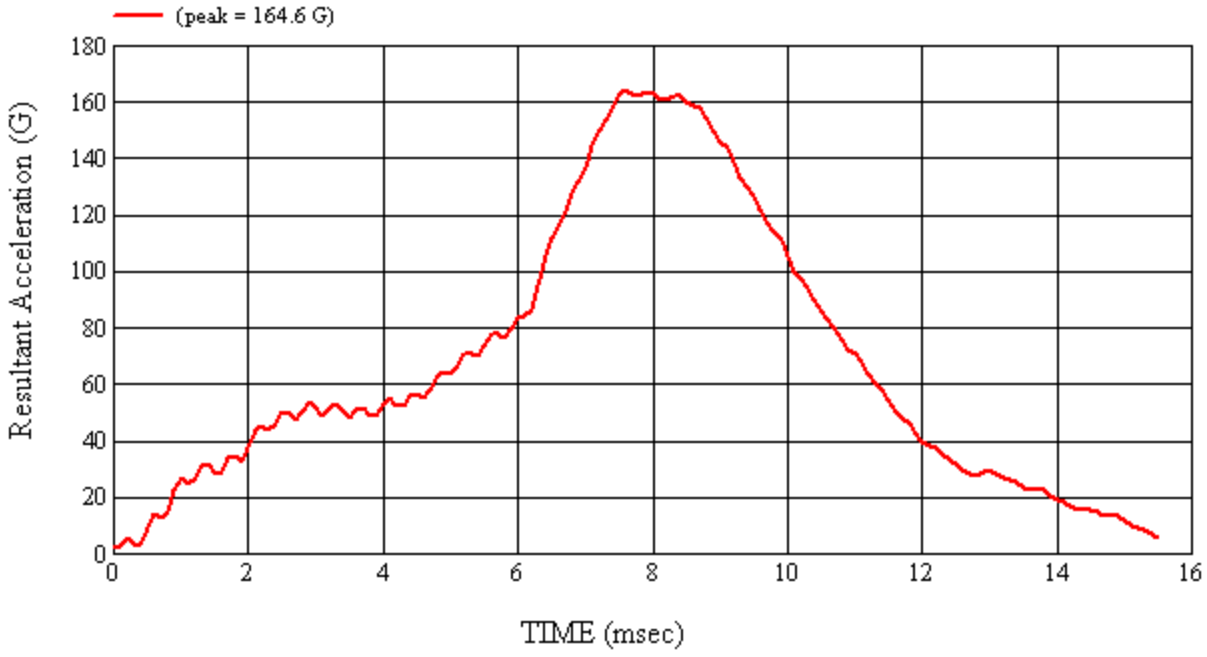
Dislodged trim, D ring compression

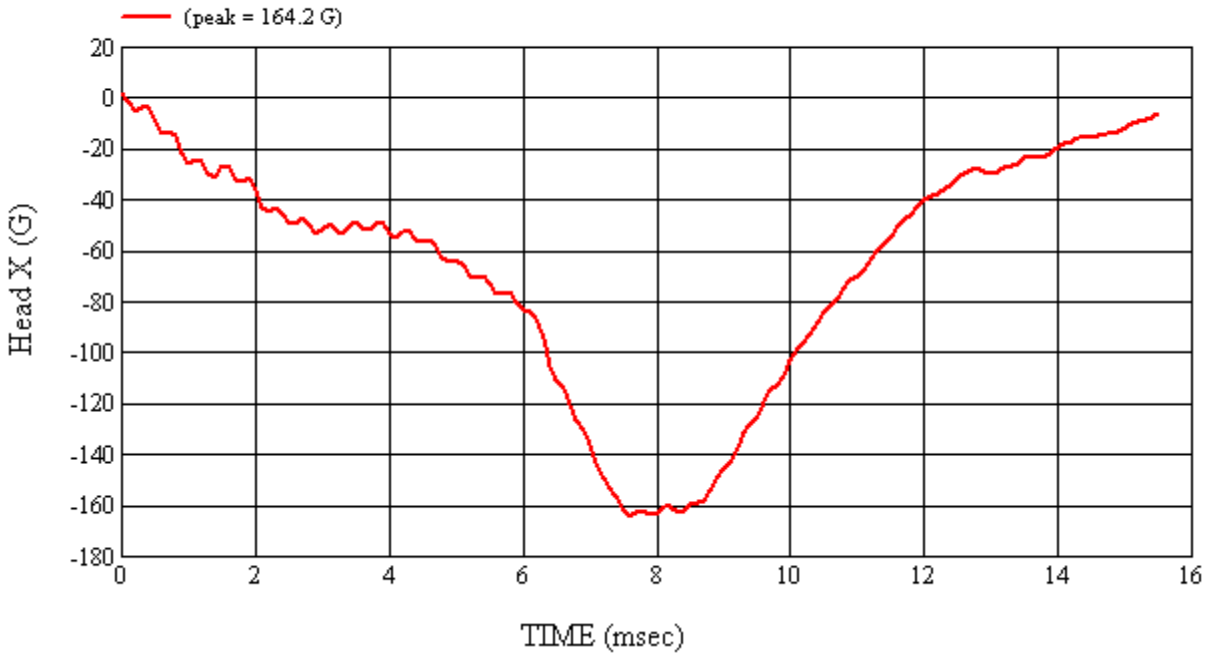
Recorded By: _____ Approved By*: _____ Date: 7/28/2011

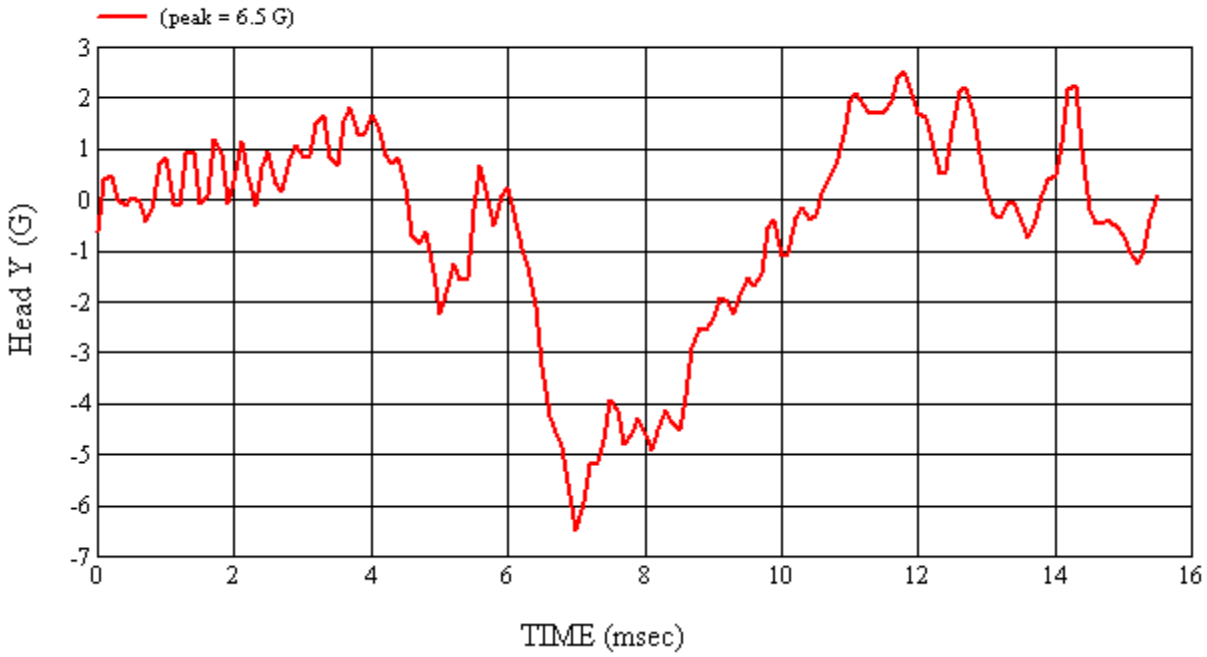
*Only necessary for NHTSA (Government) Compliance testing.

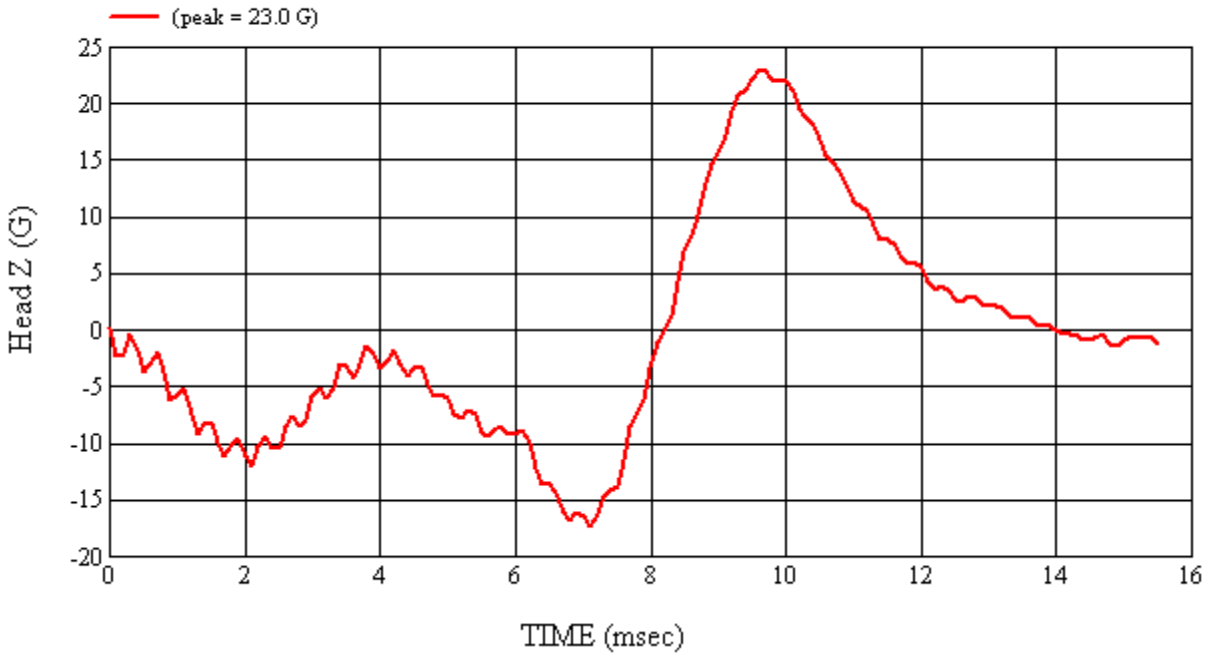
MGA Test #: U11347 Target Location: BP2, Left Side Test Date: 7/28/2011

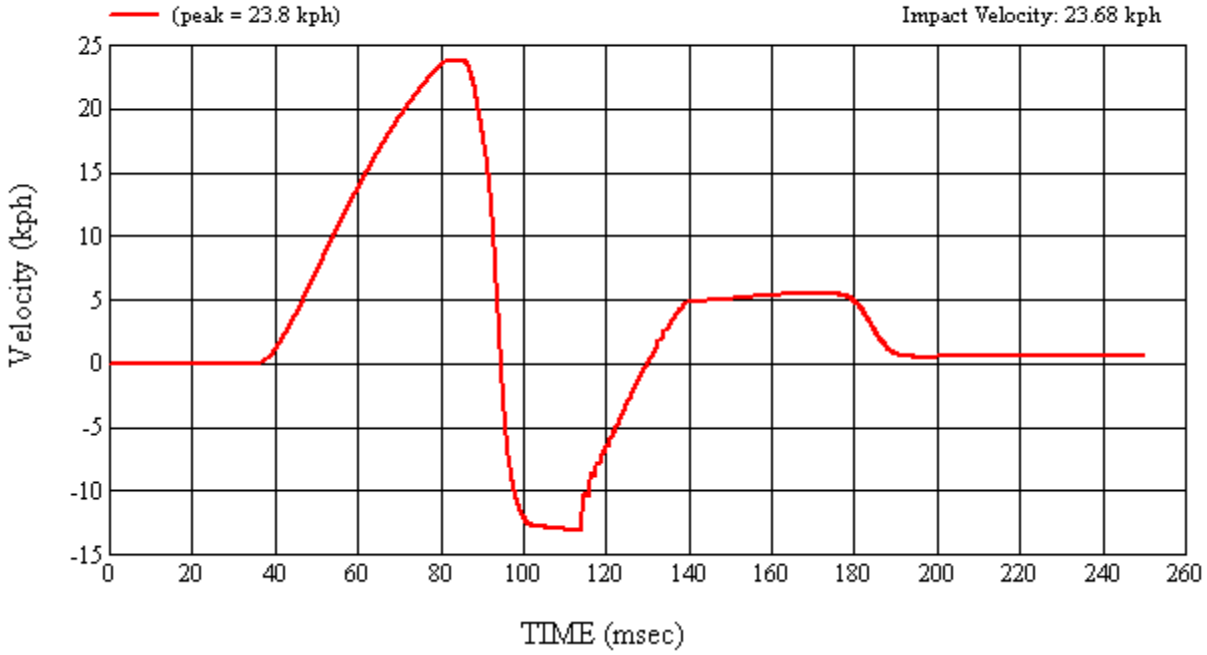


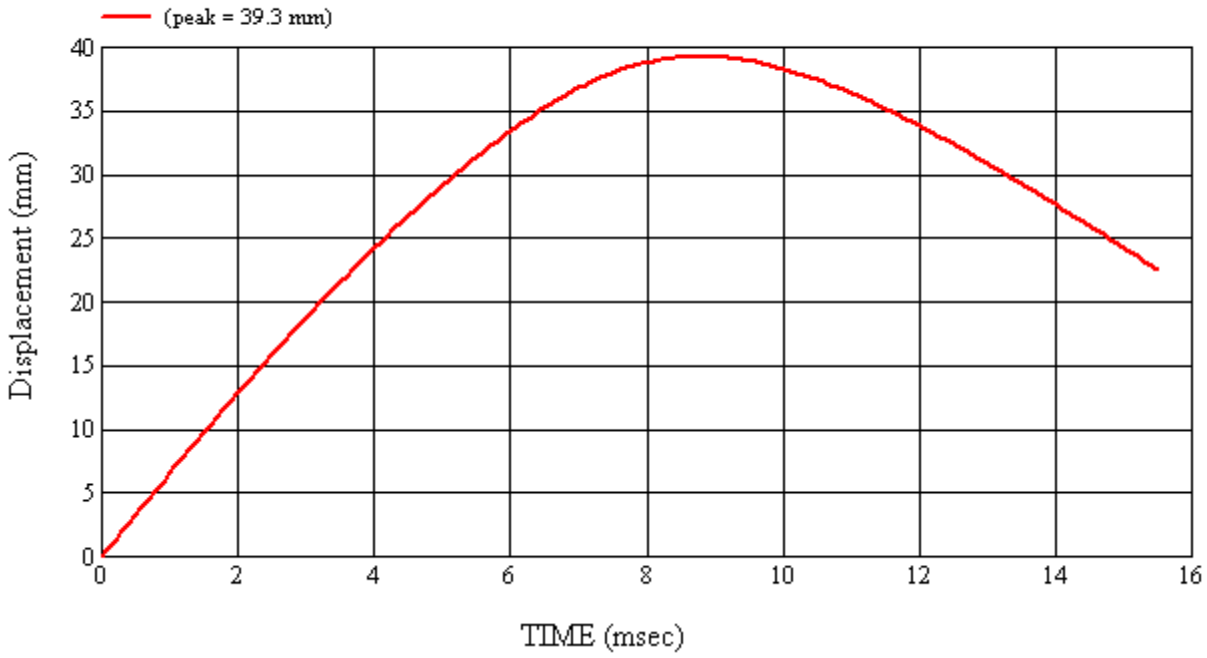



(peak = 164.2 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
0
2
4
6
8
10
12
14
16
TIME (msec)


(peak = 6.5 G)
Head Y (G)
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
0
2
4
6
8
10
12
14
16
TIME (msec)


(peak = 23.0 G)
Head Z (G)
25
20
15
10
5
0
-5
-10
-15
-20
0
2
4
6
8
10
12
14
16
TIME (msec)


(peak = 23.8 kph)
Impact Velocity: 23.68 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
-15
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 39.3 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
0
2
4
6
8
10
12
14
16
TIME (msec)


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT FH1
H/V IMPACT ANGLE= 180 / 43
U11353
PRE TEST


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT FH1
H/V IMPACT ANGLE= 180 / 43
U11353
PRE TEST
FH1-RSL
FH2


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT FH1
H/V IMPACT ANGLE= 180 / 43
U11353
POST TEST


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT FH1
H/V IMPACT ANGLE= 180 / 43
U11353
POST TEST
FH1-RBL
FR2
10 TON


FH1-RSL
FH2
CC5200
U11353
RIGHT FH1
H/V 180/43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Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT FH1
H/V IMPACT ANGLE= 180 / 43
U11353
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Target (Vehicle Side): FH1Right

MGA Test Reference No.:U11353

Approach Horizontal Angles:180º

Approach Vertical Angles:43º

Additional Description:relocation 5

Test Number:#11

Temperature:23.9C

Humidity:60.0%

Time of Test:4:42:03 PM

FMH Serial No:[037]

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
718	732	6.3	23.7	6	12 Right

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J32177	-113.7	1.07	1.07
Y	6	J14103	93.9	0.85	0.85
Z	7	J35800	97.8	0.94	0.94

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

Sunglasses holder opened, headliner retaining fastener removed

Recorded By: _____ Approved By*: _____ Date: 7/29/2011

*Only necessary for NHTSA (Government) Compliance testing.

MGA Test #: U11353 Target Location: FH1, Right Side Test Date: 7/29/2011

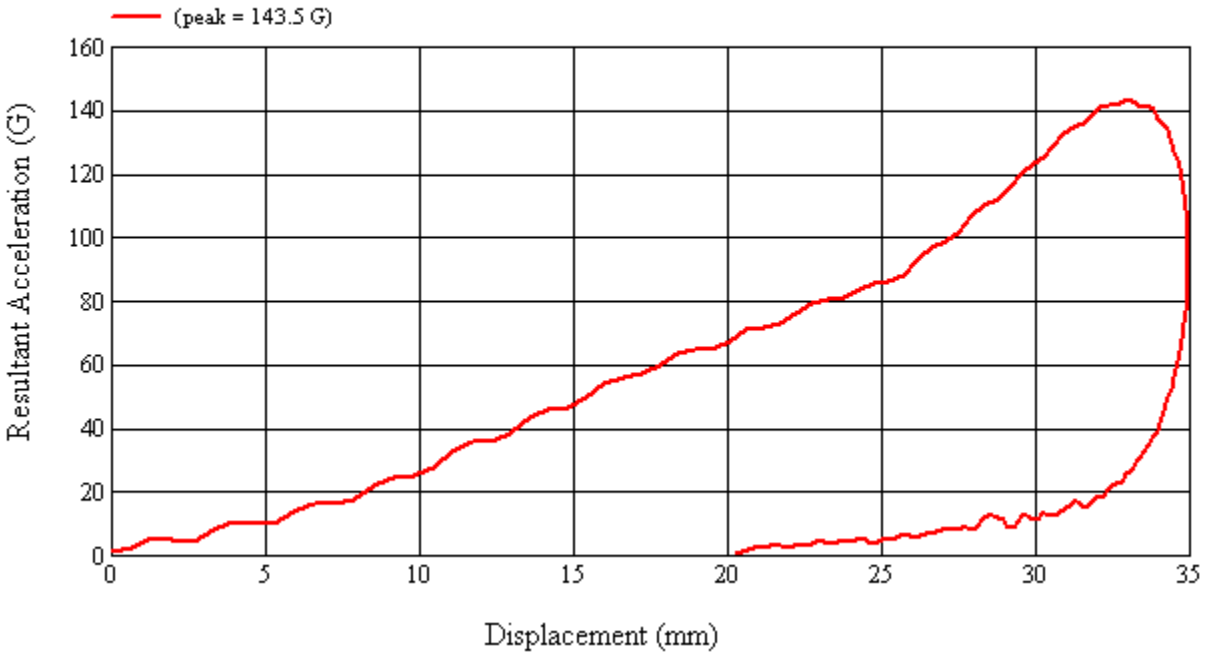
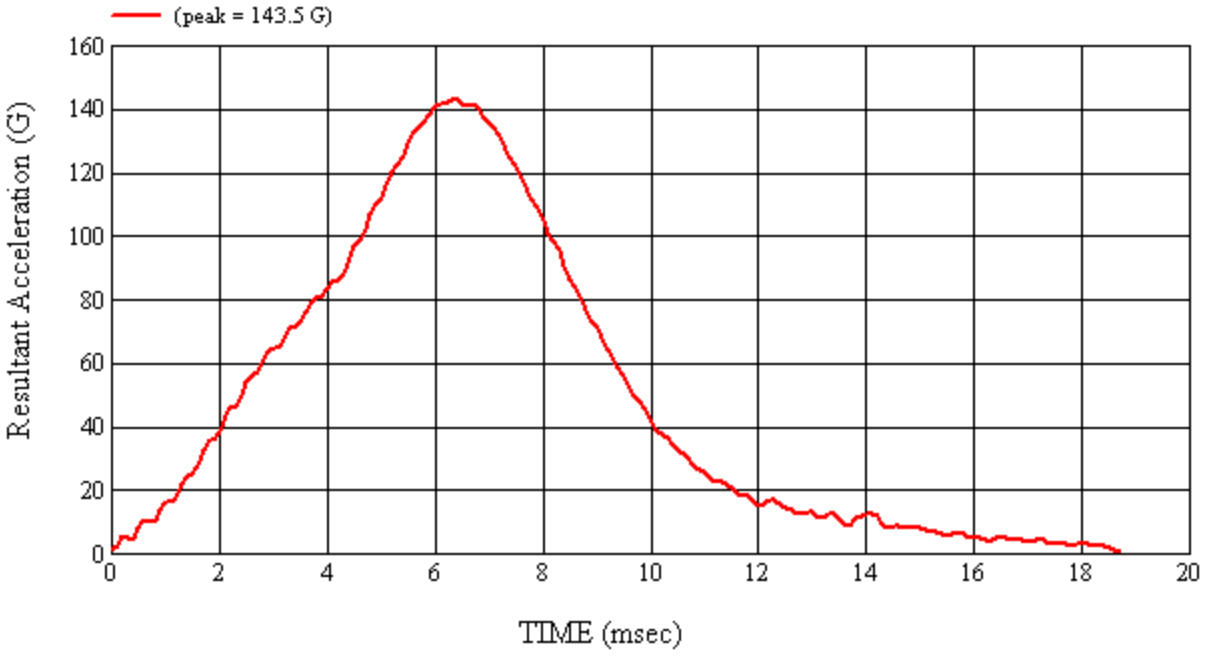
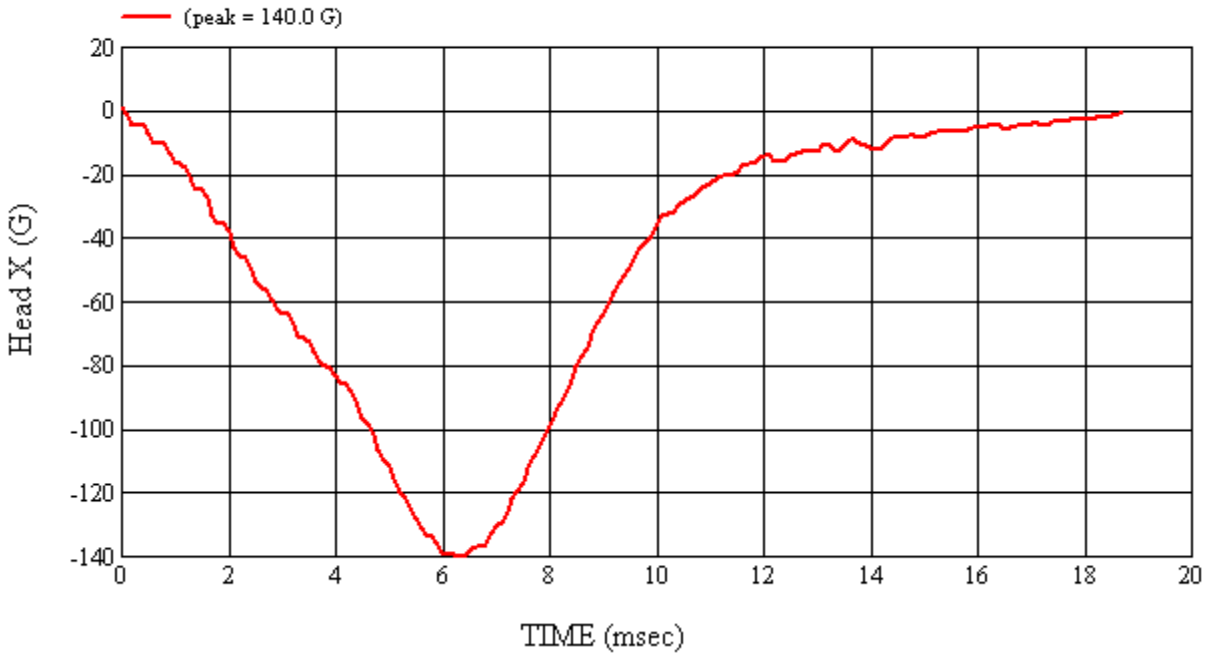
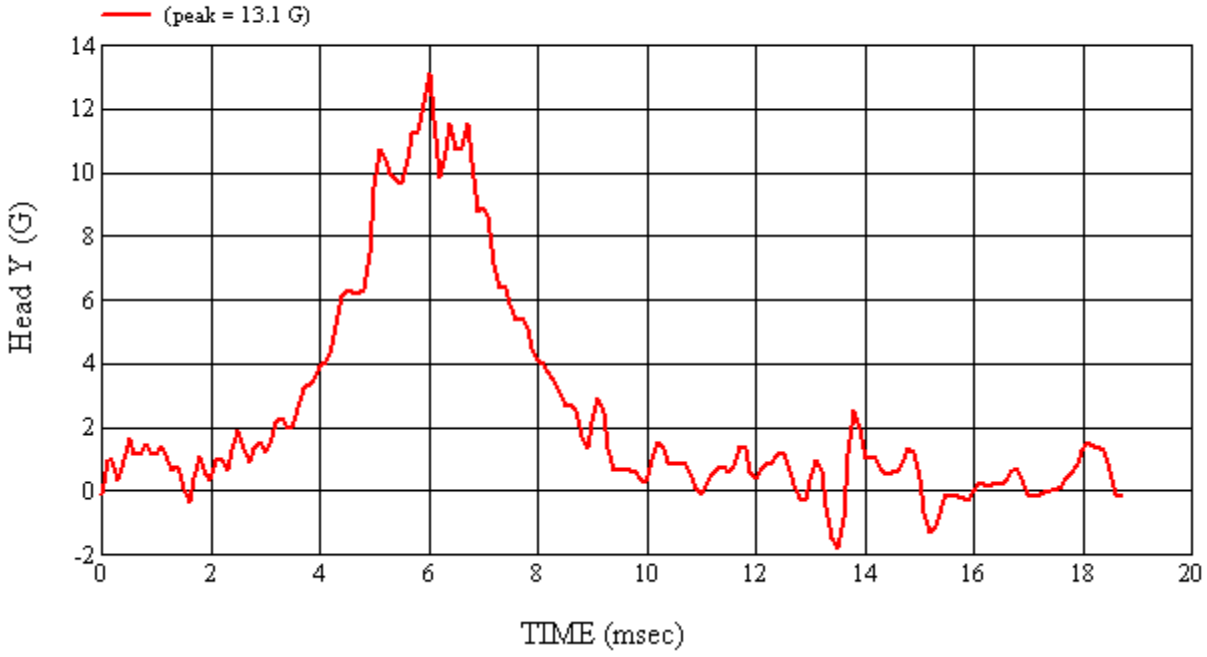
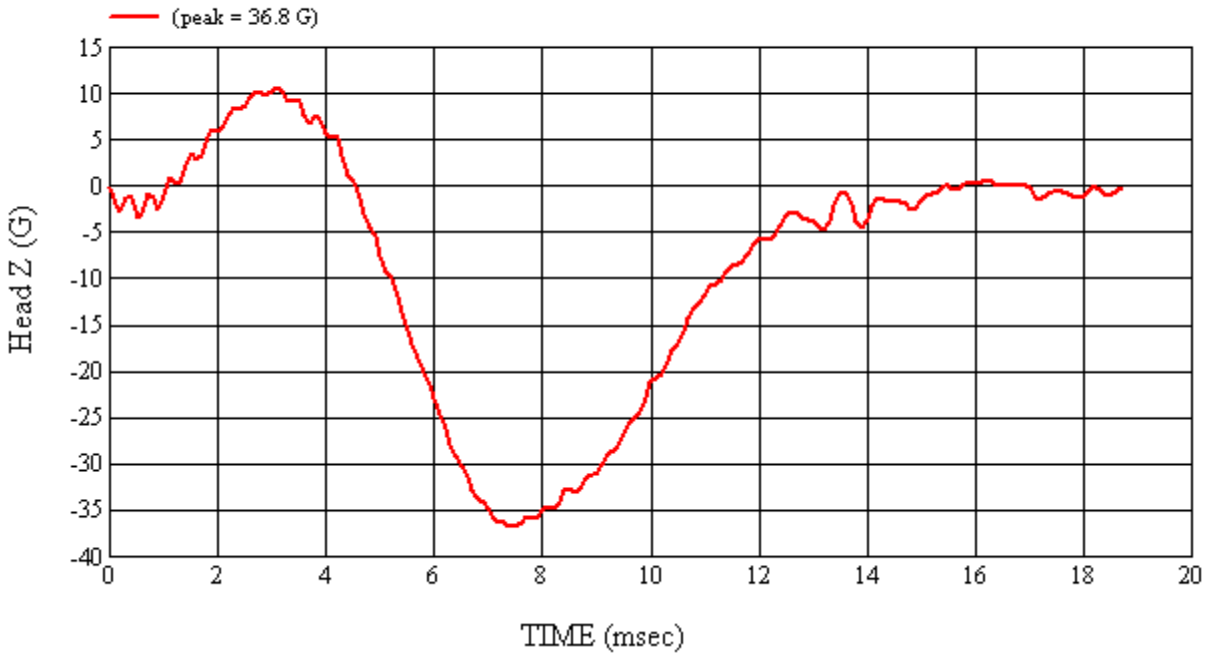


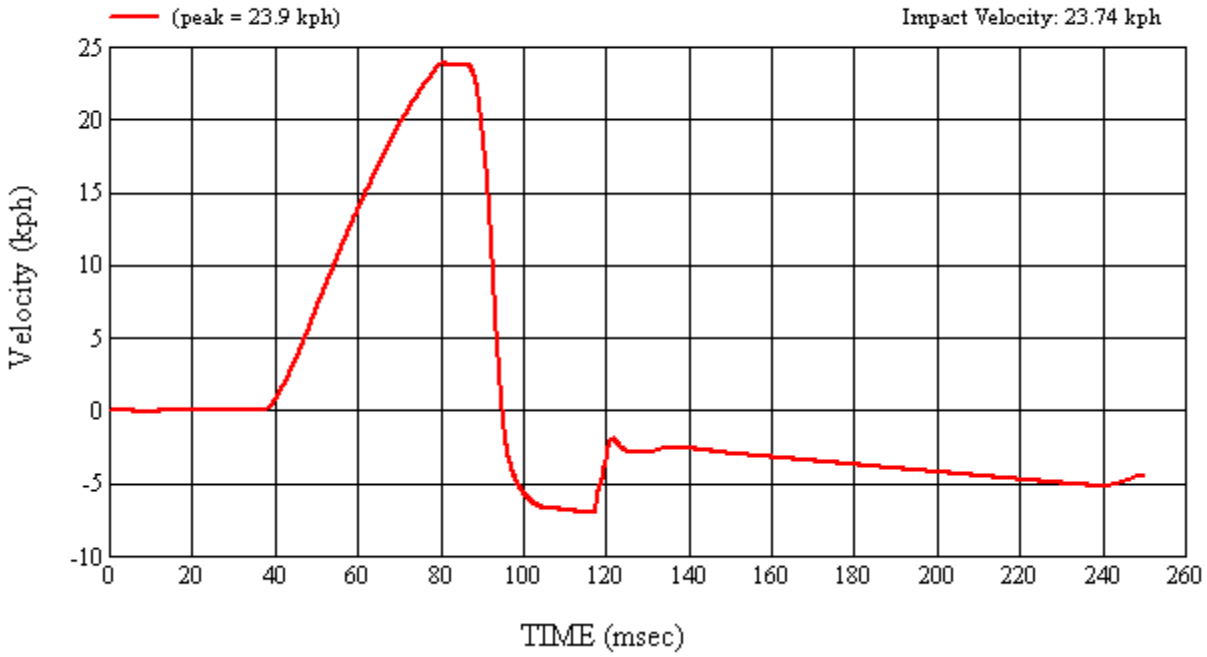
Figure 1 Test #U11353

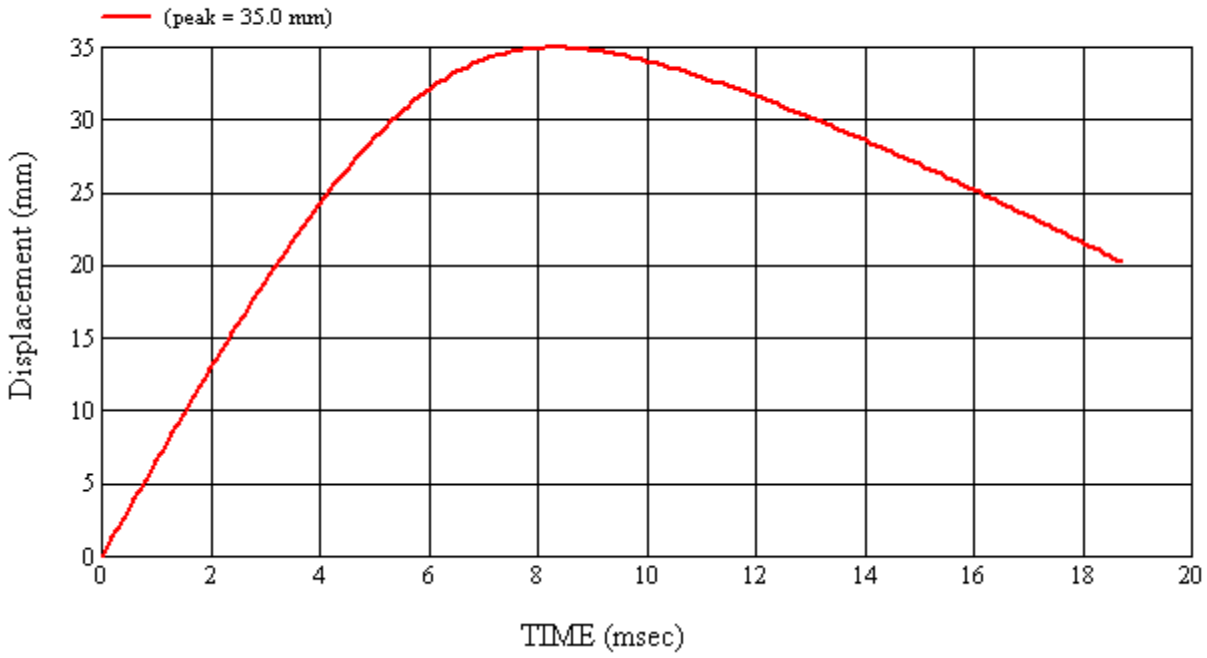



(peak = 140.0 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 13.1 G)
Head Y (G)
14
12
10
8
6
4
2
0
-2
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 36.8 G)
Head Z (G)
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 23.9 kph)
Impact Velocity: 23.74 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 35.0 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)

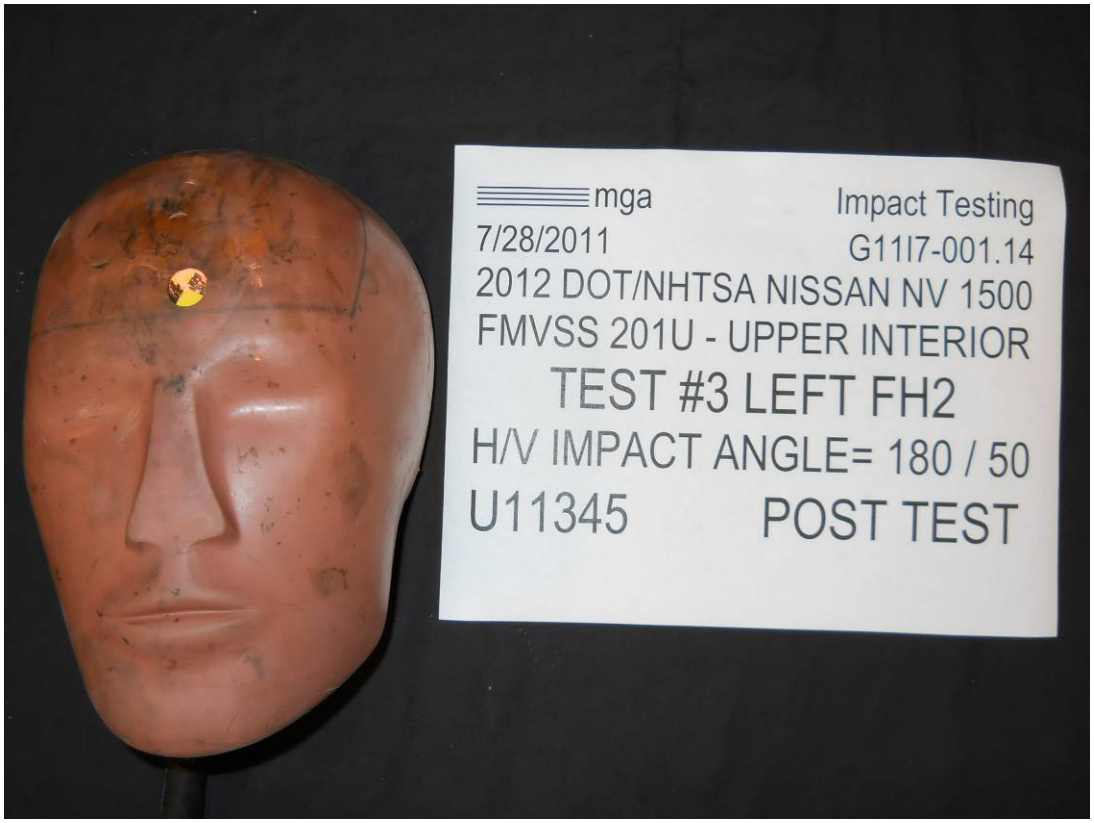

mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT FH2
H/V IMPACT ANGLE= 180 / 50
U11345
PRE TEST


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT FH2
H/V IMPACT ANGLE= 180 / 50
U11345
PRE TEST


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT FH2
H/V IMPACT ANGLE= 180 / 50
U11345
POST TEST
CC5200
U11345
LEFT FH2
H/V 180/50


FH1 - REL
FH2
mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT FH2
H/V IMPACT ANGLE= 180 / 50
U11345
POST TEST


FH1-REL
FH2


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT FH2
H/V IMPACT ANGLE= 180 / 50
U11345
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Test Number:#3

Target (Vehicle Side): FH2Left

Temperature:22.7C

MGA Test Reference No.:U11345

Humidity:66.1%

Approach Horizontal Angles:180º

Time of Test:1:54:13 PM

Approach Vertical Angles:50º

FMH Serial No:[038]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
552	511	4.5	23.5	8	6 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-96.4	1.07	1.07
Y	6	J36197	108.7	0.85	0.85
Z	7	J36353	99.1	0.94	0.94

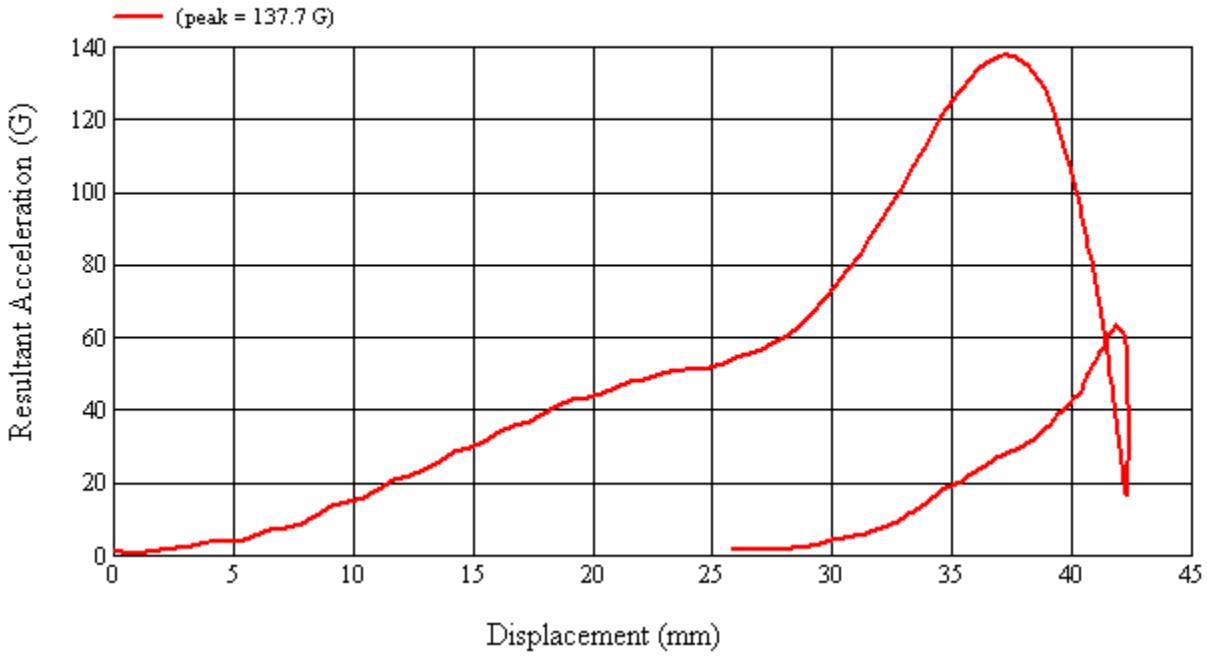
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

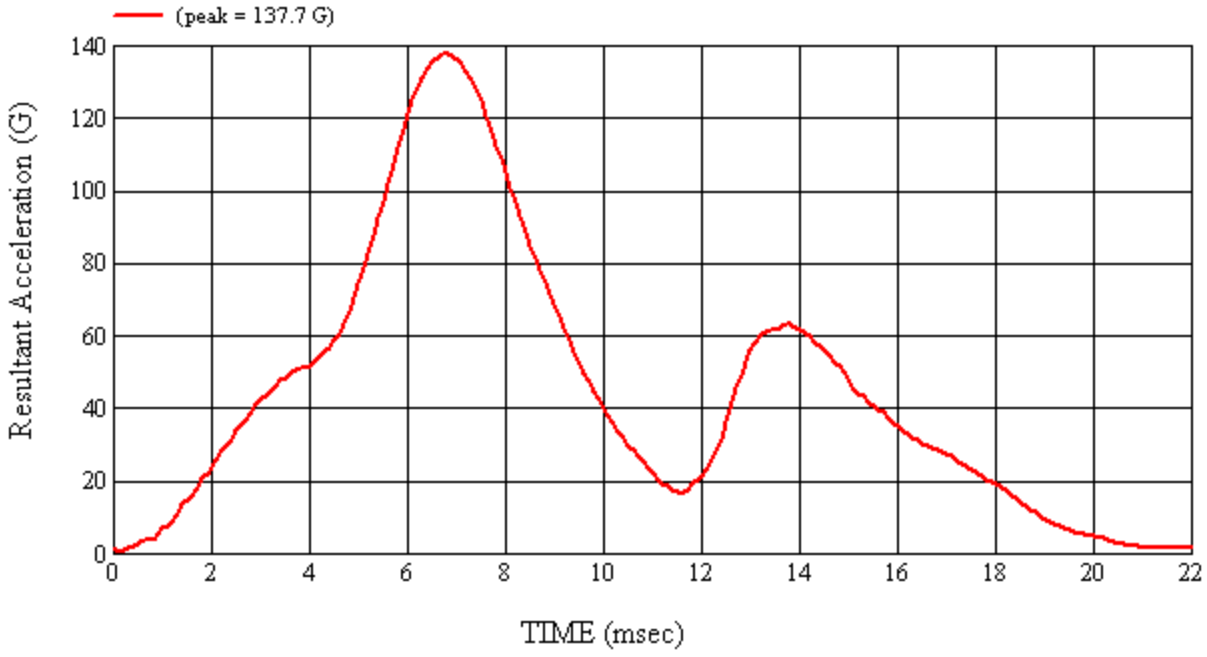
Headliner deformation

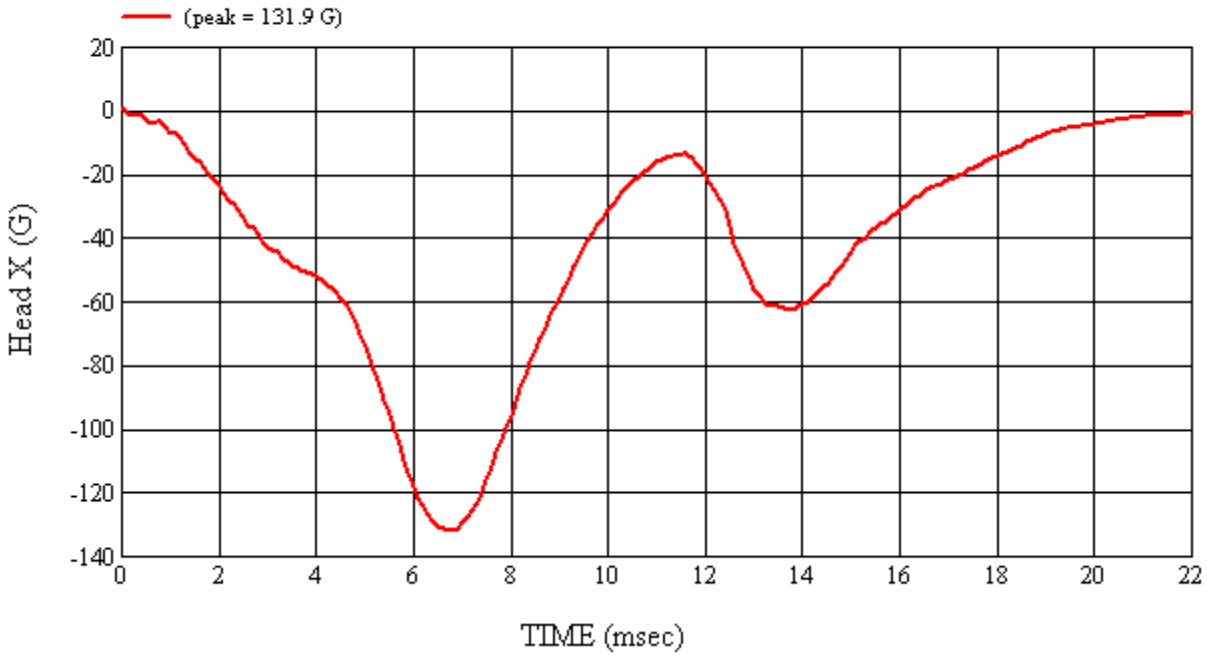
Recorded By: _____ Approved By*: _____ Date: 7/28/2011

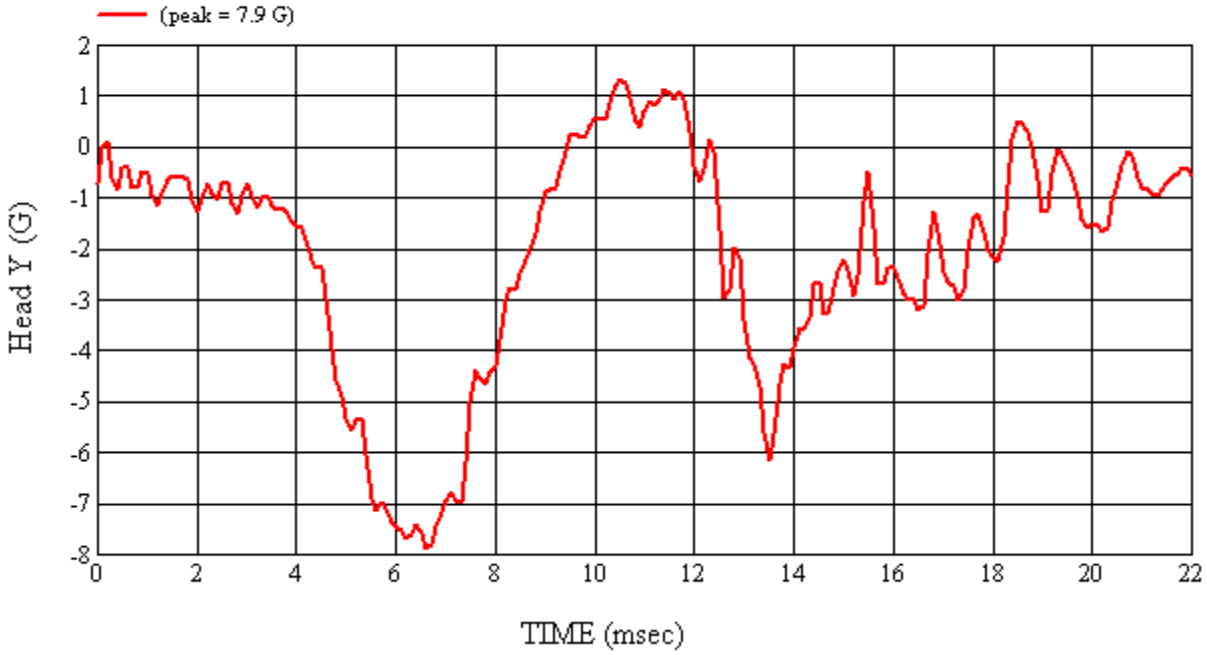
*Only necessary for NHTSA (Government) Compliance testing.

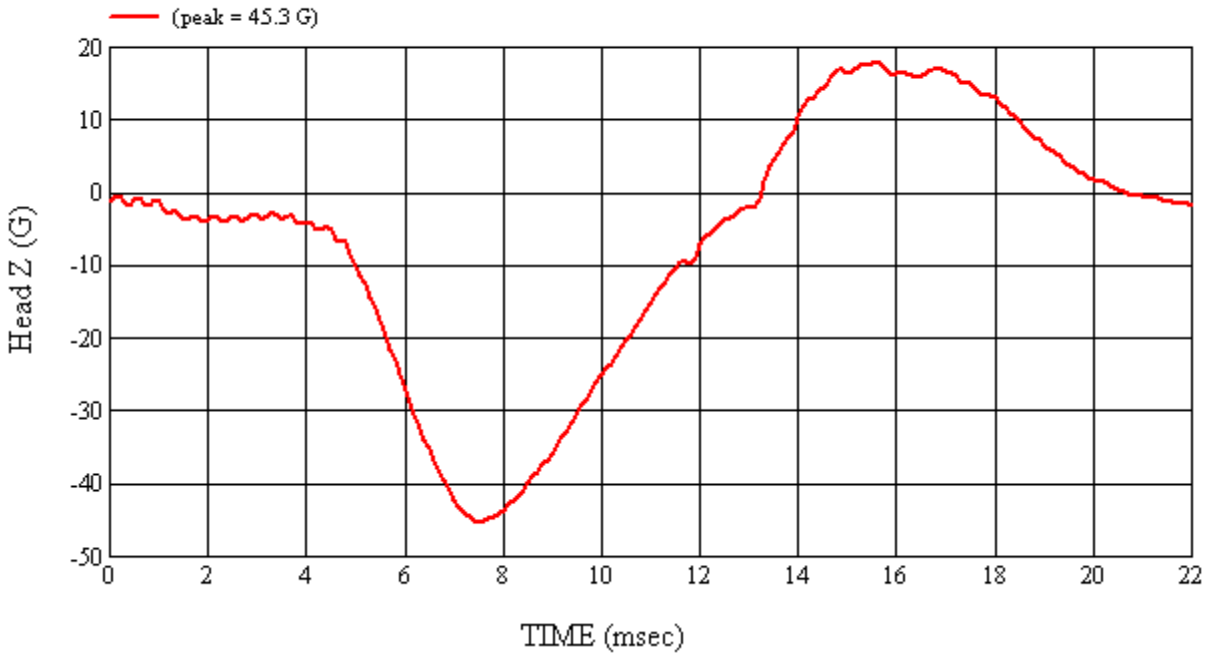
MGA Test #: U11345 Target Location: FH2, Left Side Test Date: 7/28/2011

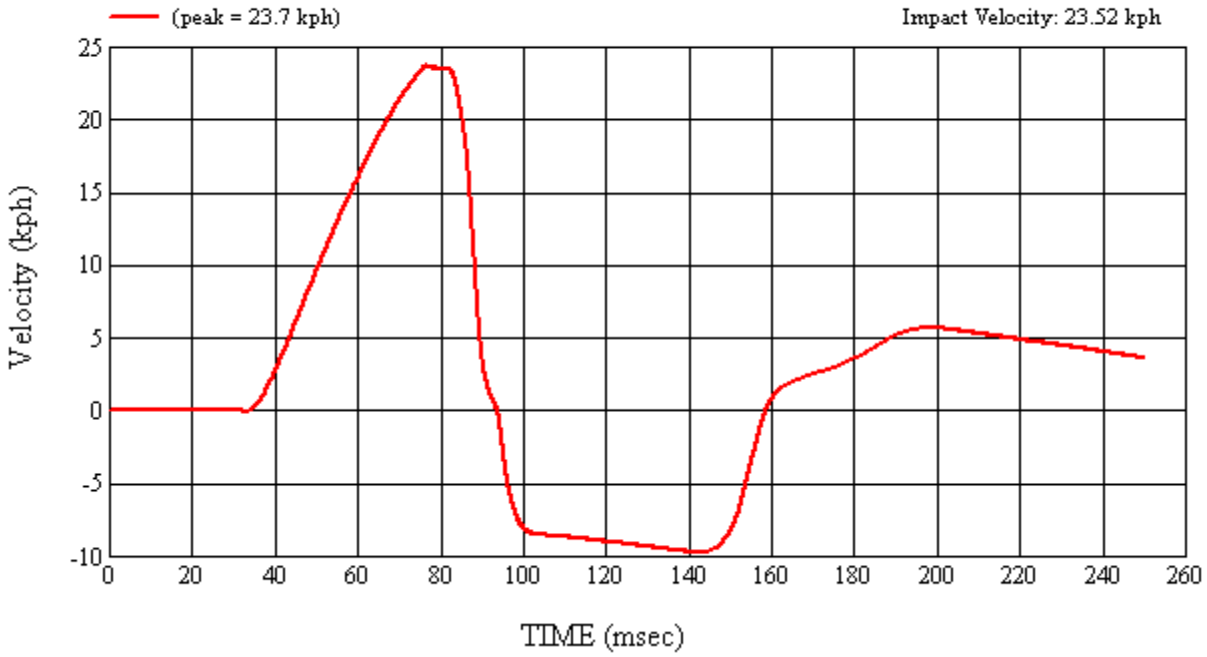


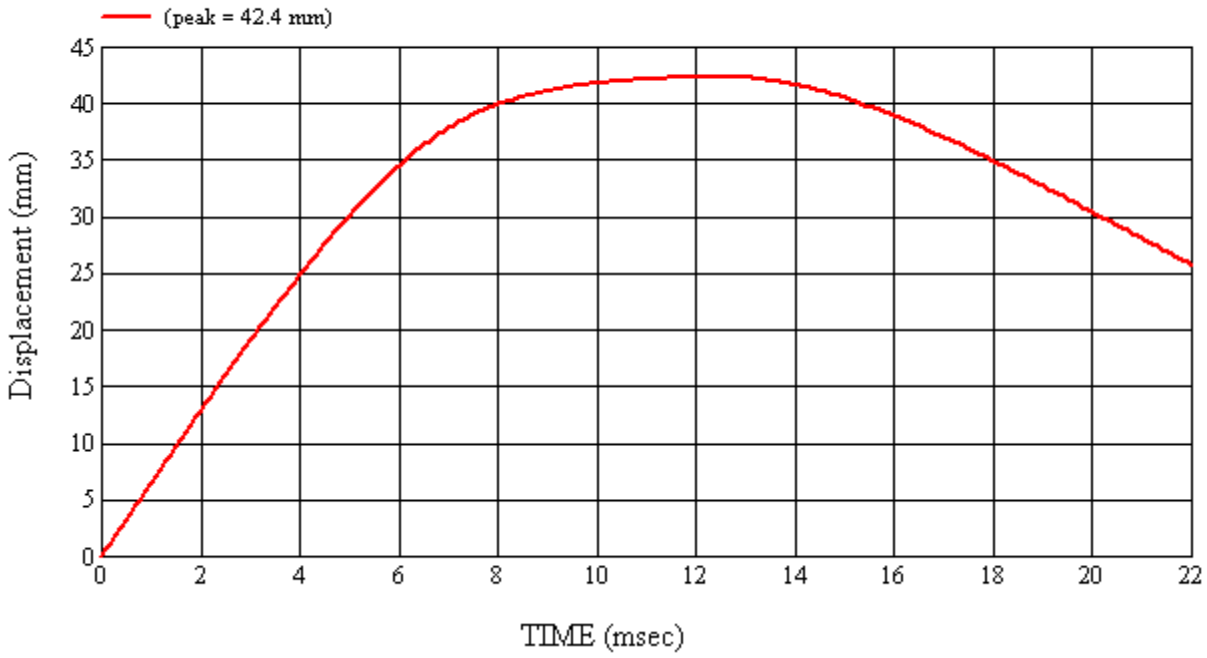



(peak = 131.9 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)

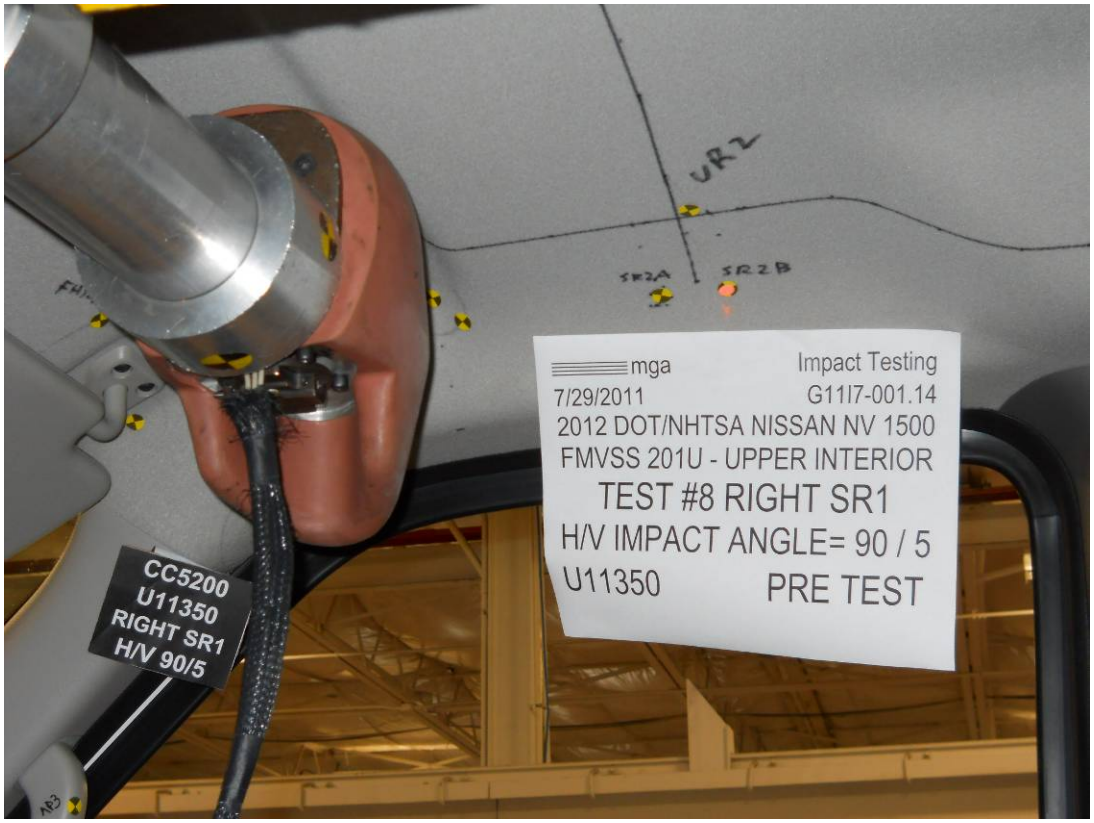

(peak = 7.9 G)
Head Y (G)
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 45.3 G)
Head Z (G)
20
10
0
-10
-20
-30
-40
-50
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 23.7 kph)
Impact Velocity: 23.52 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)

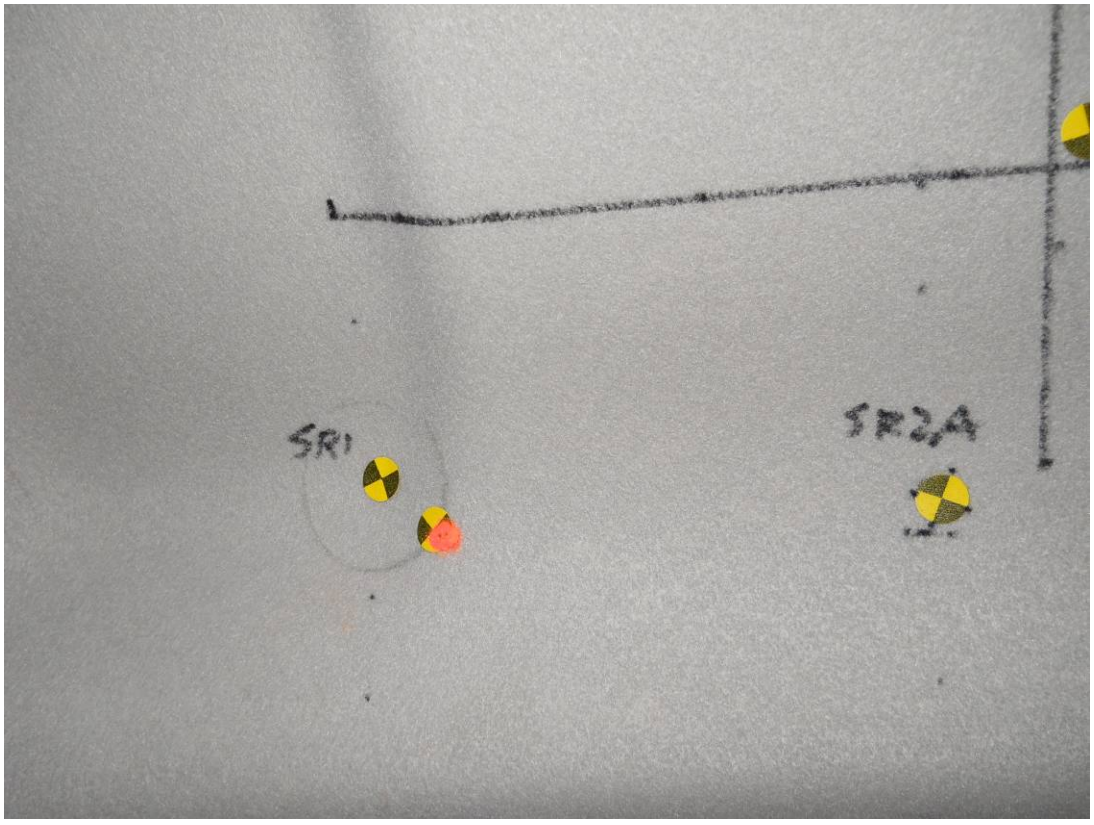

(peak = 42.4 mm)
Displacement (mm)
45
40
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


mga
Impact Testing
G11I7-001.14
7/29/2011
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT SR1
H/V IMPACT ANGLE= 90 / 5
U11350
PRE TEST
CC5200
U11350
RIGHT SR1
H/V 90/5


mga
Impact Testing
G11I7-001.14
7/29/2011
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT SR1
H/V IMPACT ANGLE= 90 / 5
U11350
PRE TEST
CC5200
U11350
RIGHT SR1
H/V 90/5


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT SR1
H/V IMPACT ANGLE= 90 / 5
U11350
POST TEST
CC5200
U11350
RIGHT SR1
H/V 90/5


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT SR1
H/V IMPACT ANGLE= 90 / 5
U11350
POST TEST
CC5200
U11350


SR1
SR2A


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT SR1
H/V IMPACT ANGLE= 90 / 5
U11350
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Target (Vehicle Side): SR1Right

MGA Test Reference No.:U11350

Approach Horizontal Angles:90º

Approach Vertical Angles:5º

Additional Description:1 relocation

Test Number:#8

Temperature:22.6C

Humidity:61.2%

Time of Test:10:58:19 AM

FMH Serial No:[037]

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
284	156	8.4	23.7	58	29 Right

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J32177	-113.7	1.07	1.07
Y	6	J14103	93.9	0.85	0.85
Z	7	J35800	97.8	0.94	0.94

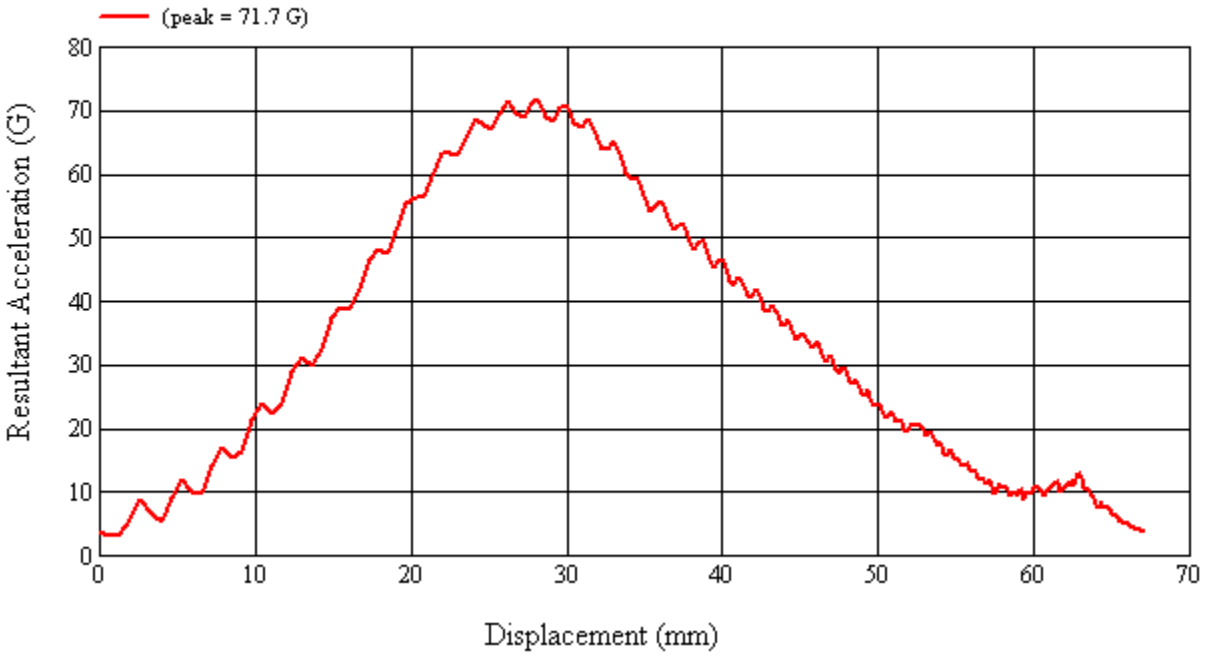
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

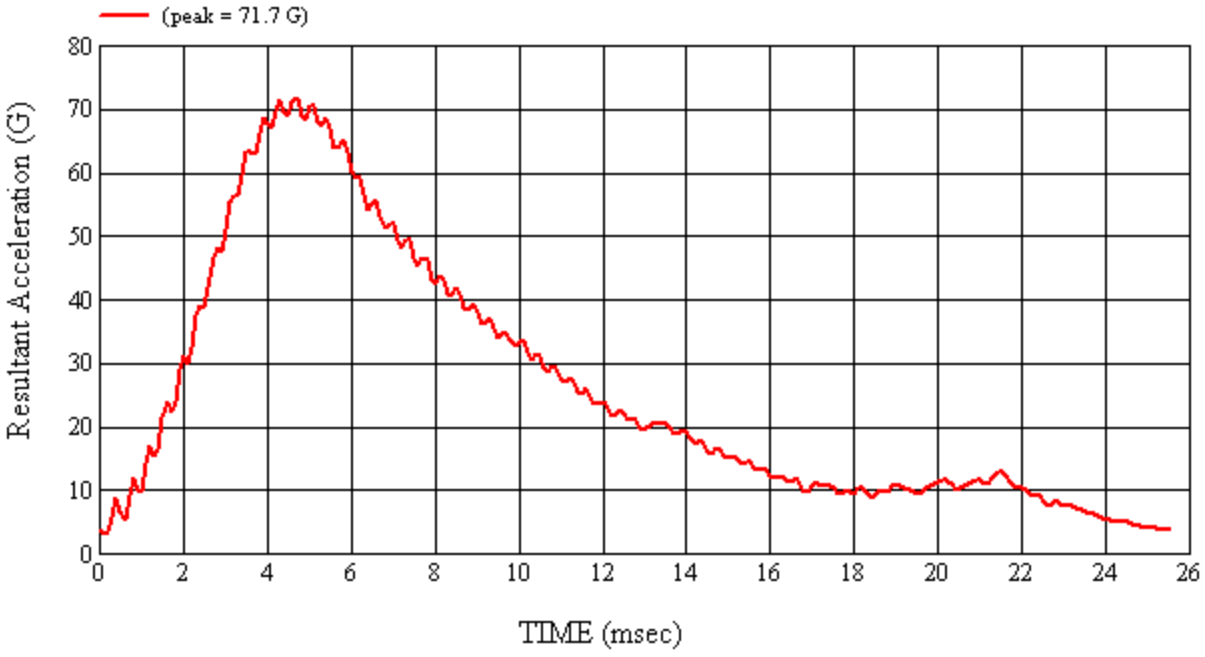
No visible damage

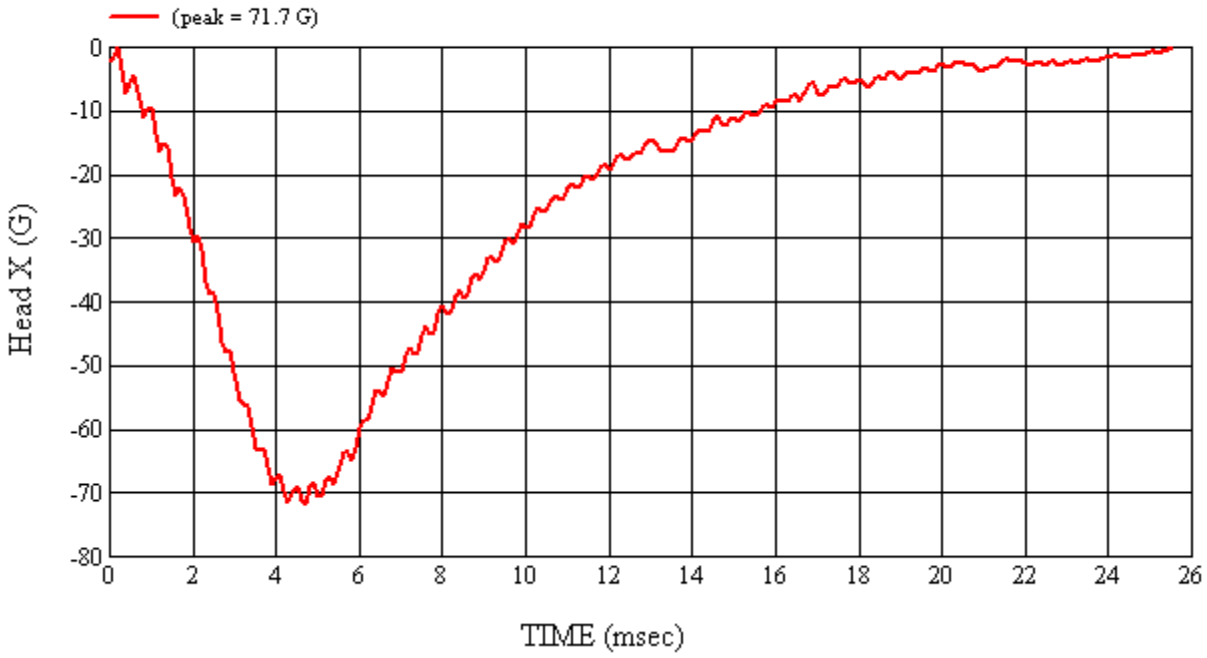
Recorded By: _____ Approved By*: _____ Date: 7/29/2011

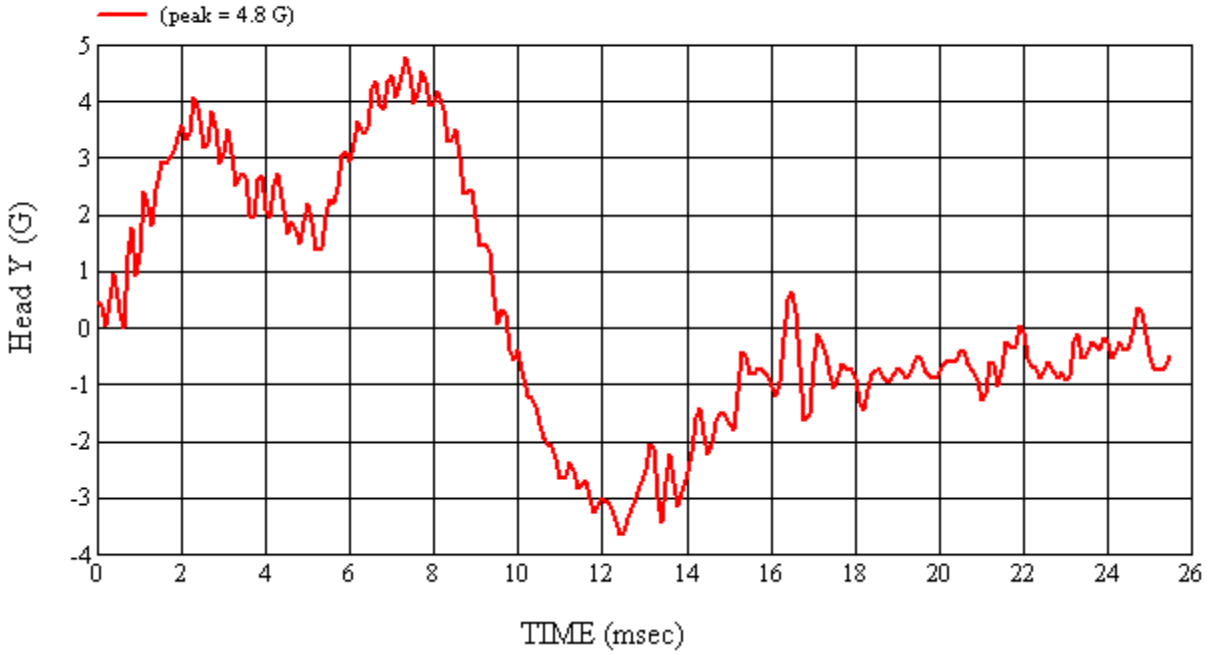
*Only necessary for NHTSA (Government) Compliance testing.

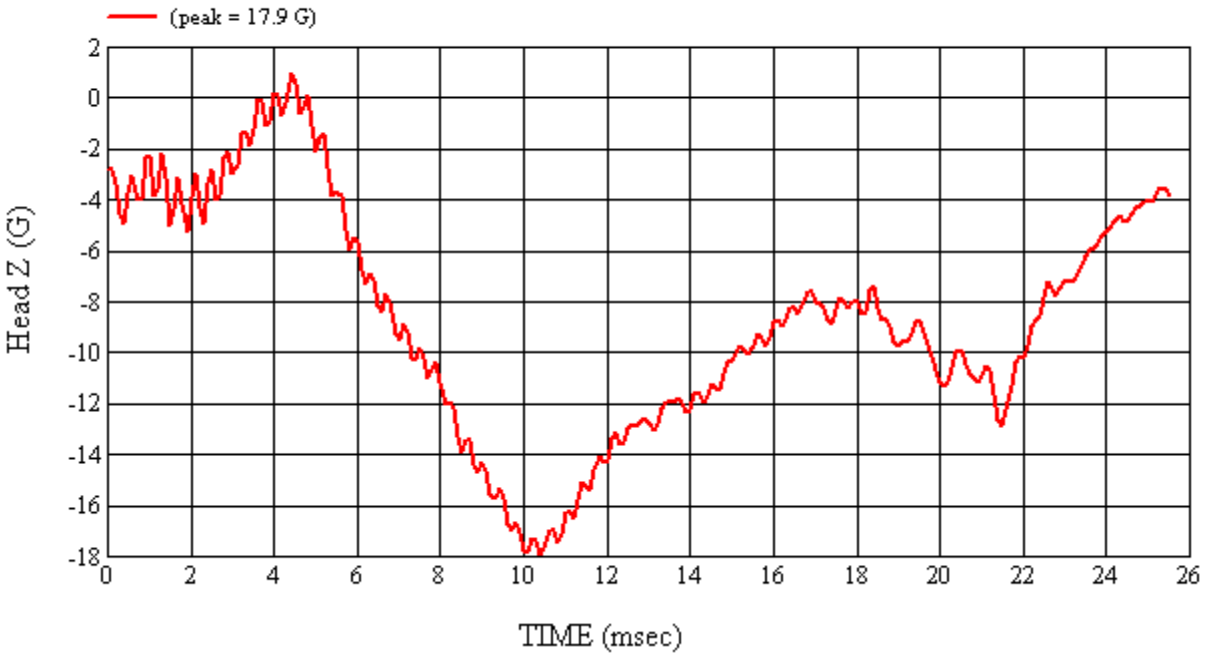
MGA Test #: U11350 Target Location: SR1, Right Side Test Date: 7/29/2011

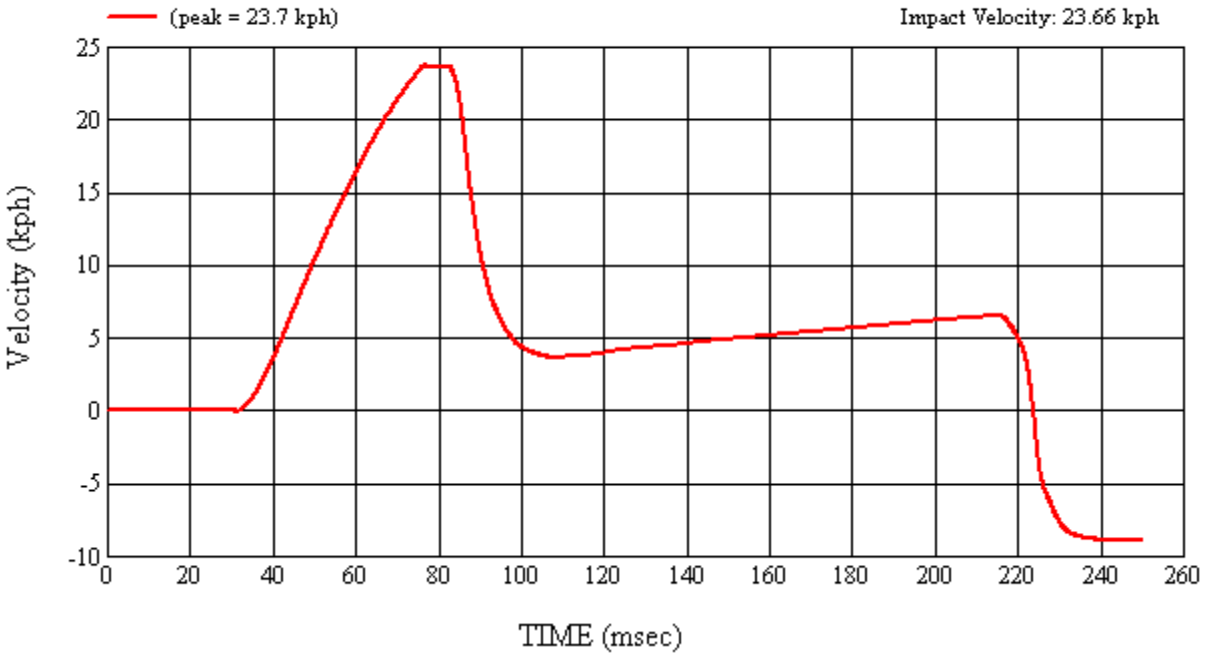


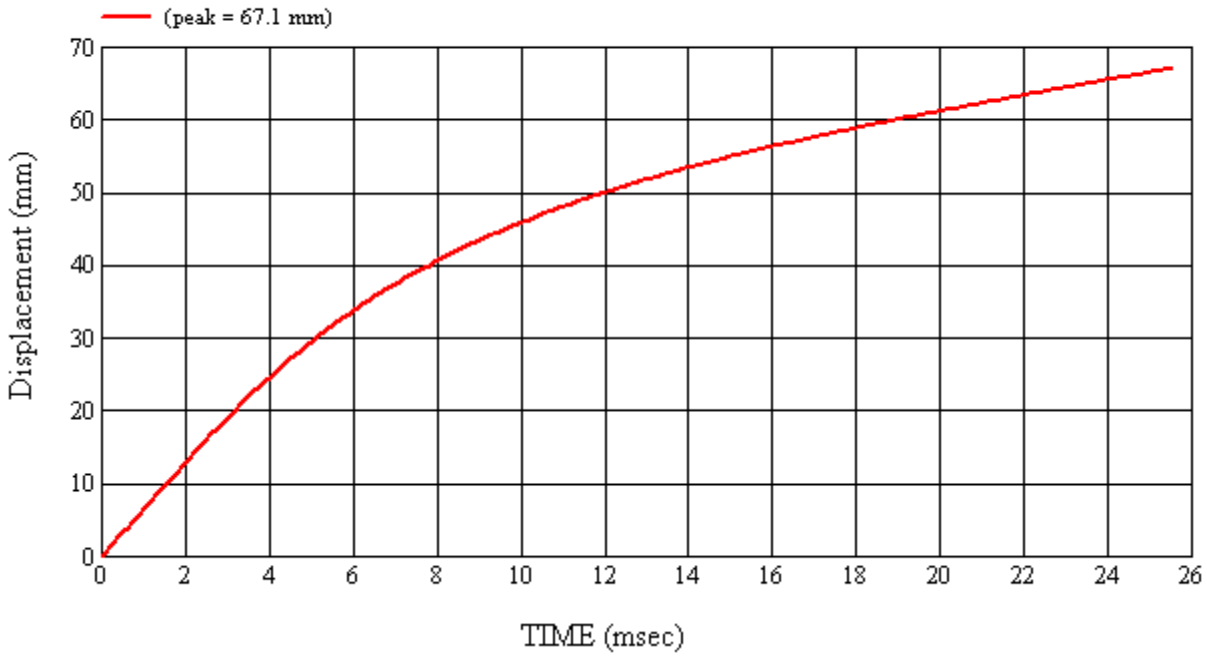



(peak = 71.7 G)
Head X (G)
0
-10
-20
-30
-40
-50
-60
-70
-80
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)

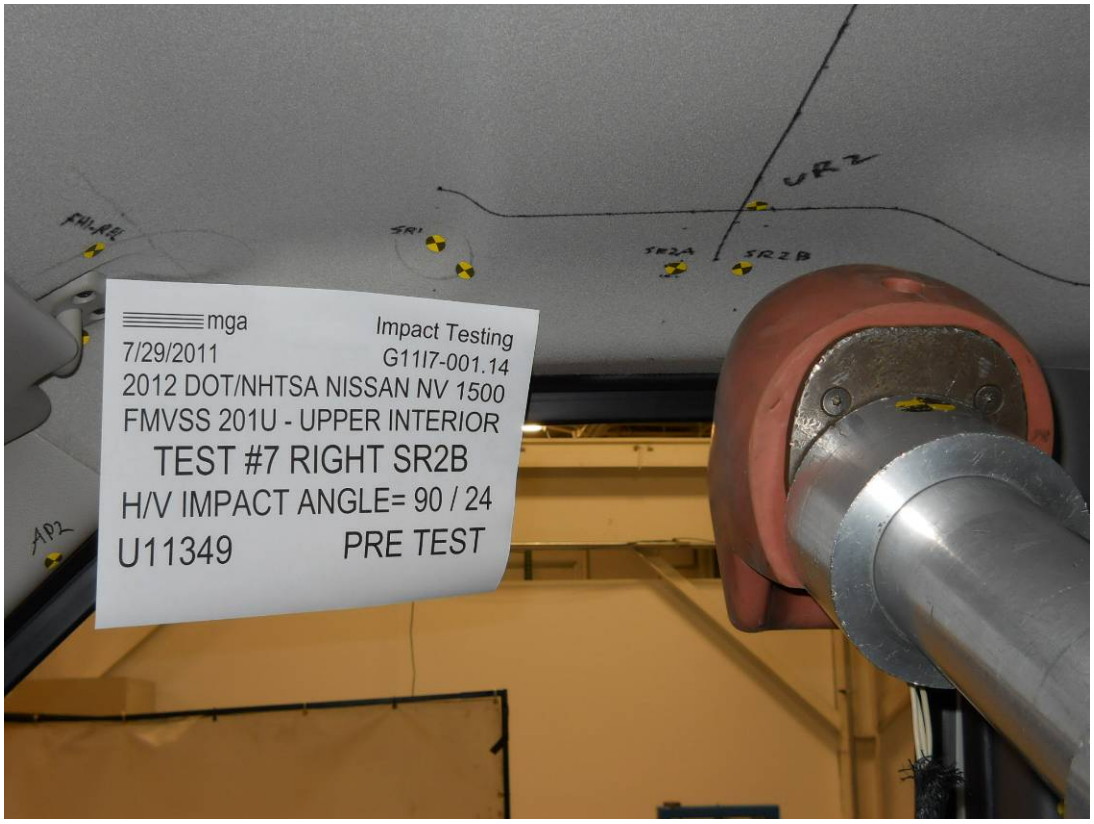

(peak = 4.8 G)
Head Y (G)
5
4
3
2
1
0
-1
-2
-3
-4
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


(peak = 17.9 G)
Head Z (G)
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


(peak = 23.7 kph)
Impact Velocity: 23.66 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)

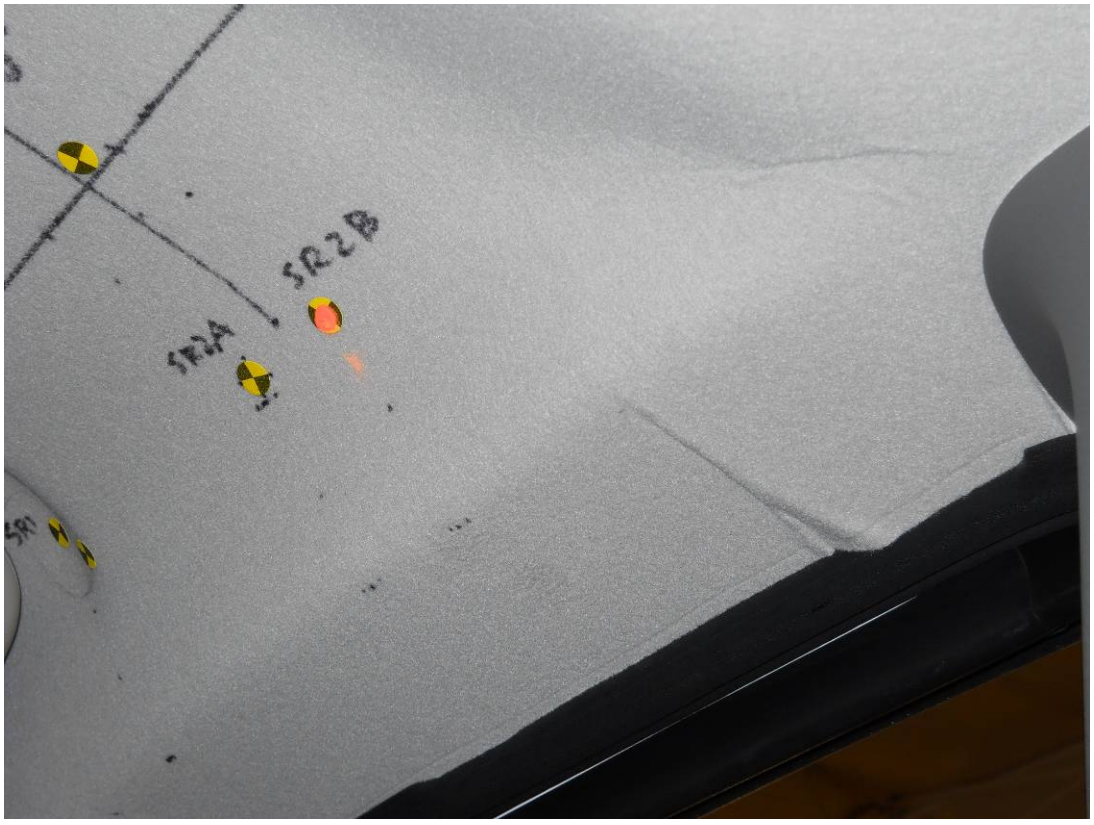

(peak = 67.1 mm)
Displacement (mm)
70
60
50
40
30
20
10
0
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TIME (msec)


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR2B
H/V IMPACT ANGLE= 90 / 24
U11349
PRE TEST


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR2B
H/V IMPACT ANGLE= 90 / 24
U11349
PRE TEST


mga
7/29/2011
Impact Testing
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR2B
H/V IMPACT ANGLE= 90 / 24
U11349
POST TEST


mga
7/29/2011
Impact Testing
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR2B
H/V IMPACT ANGLE= 90 / 24
U11349
POST TEST


SR2B
SR2A


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT SR2B
H/V IMPACT ANGLE= 90 / 24
U11349
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Test Number:#7

Target (Vehicle Side): SR2BRight

Temperature:22.6C

MGA Test Reference No.:U11349

Humidity:60.7%

Approach Horizontal Angles:90º

Time of Test:9:52:27 AM

Approach Vertical Angles:24º

FMH Serial No:[035]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
446	371	7.9	23.8	50	2 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-95.8	1.07	1.07
Y	6	J22664	94.2	0.85	0.85
Z	7	J35924	92.8	0.94	0.94

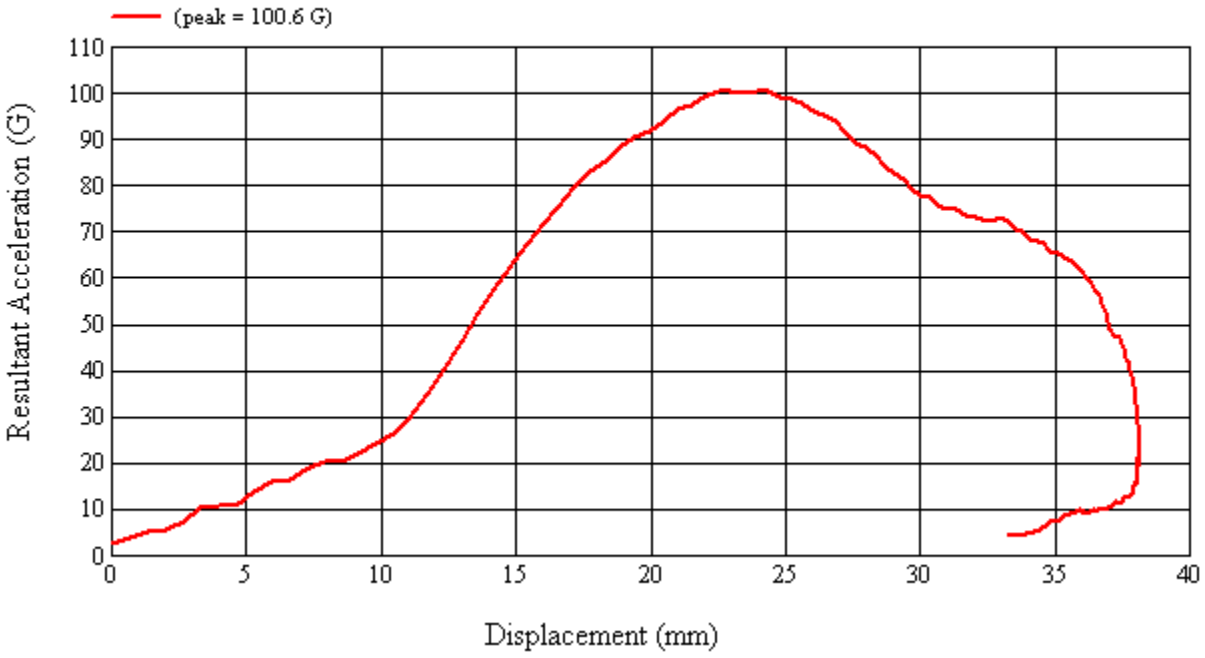
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

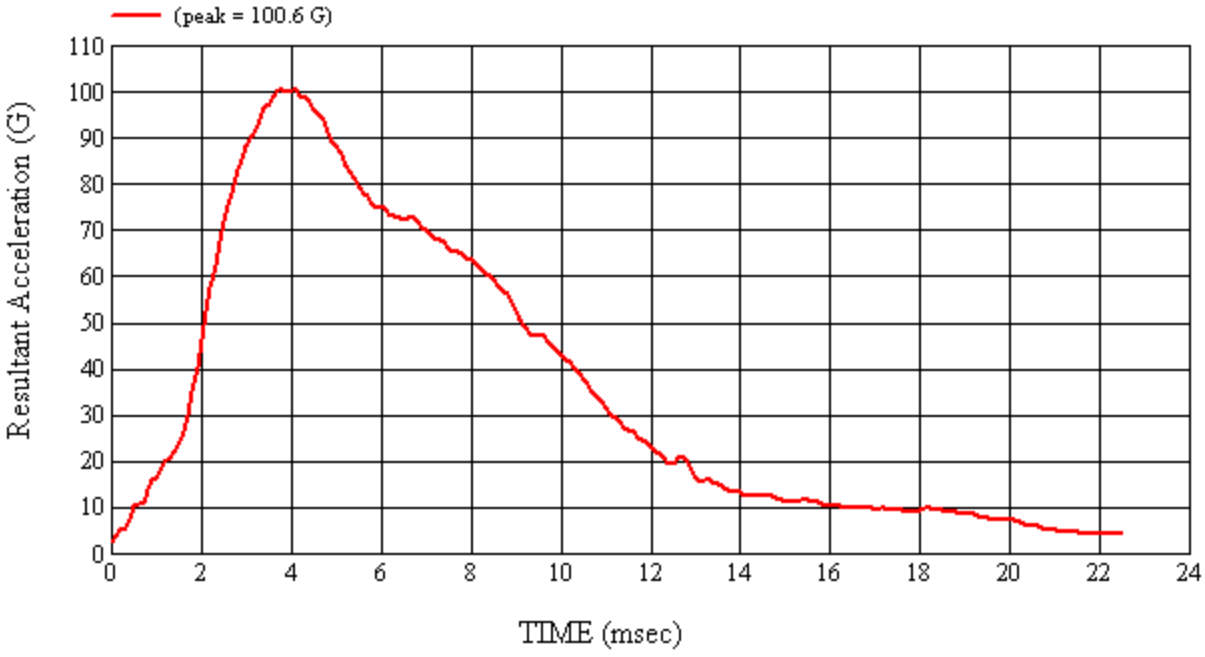
Headliner deformation, dislodged headliner, headliner retaining fastener removed

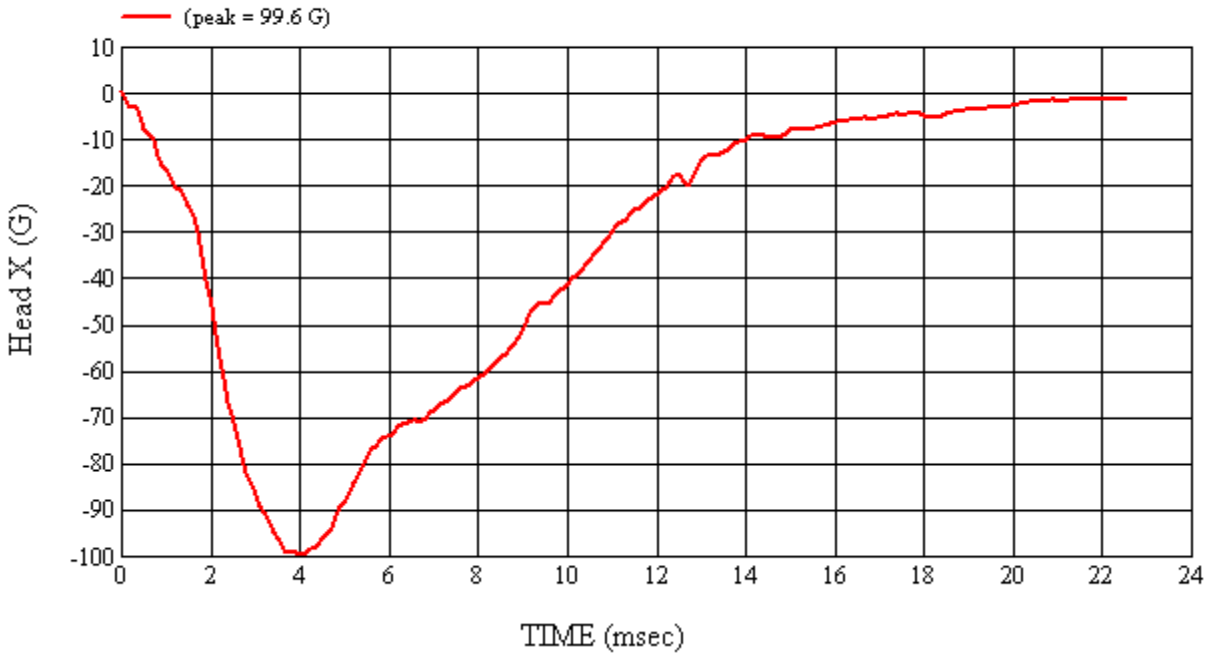
Recorded By: _____ Approved By*: _____ Date: 7/29/2011

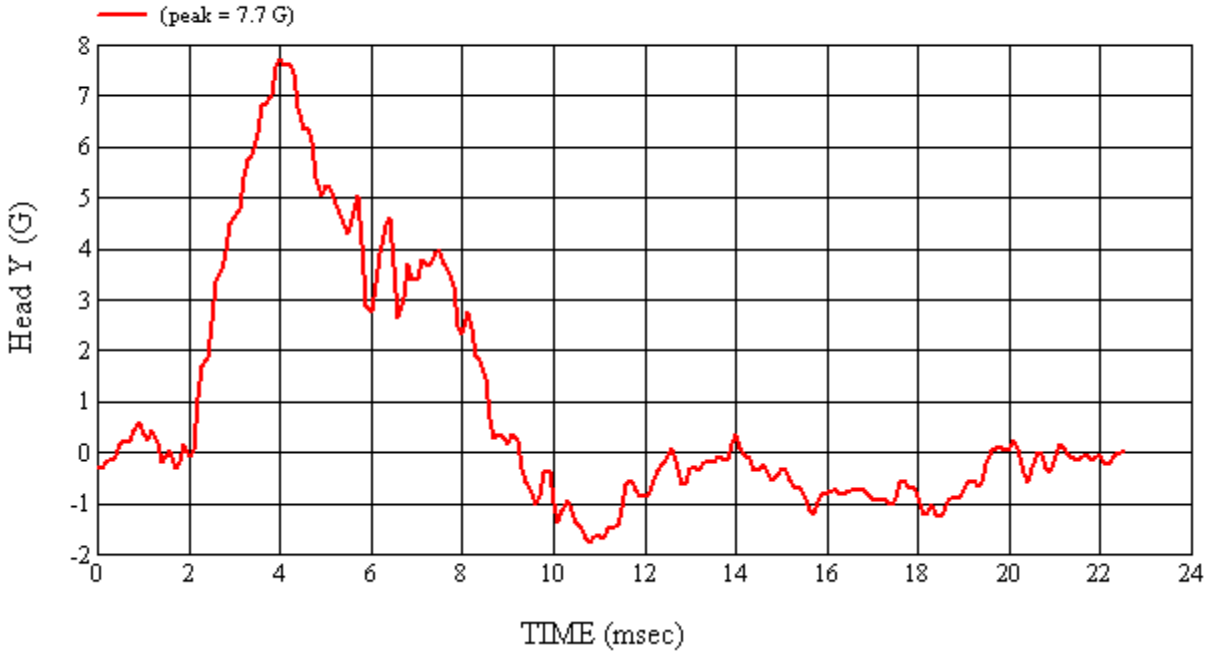
*Only necessary for NHTSA (Government) Compliance testing.

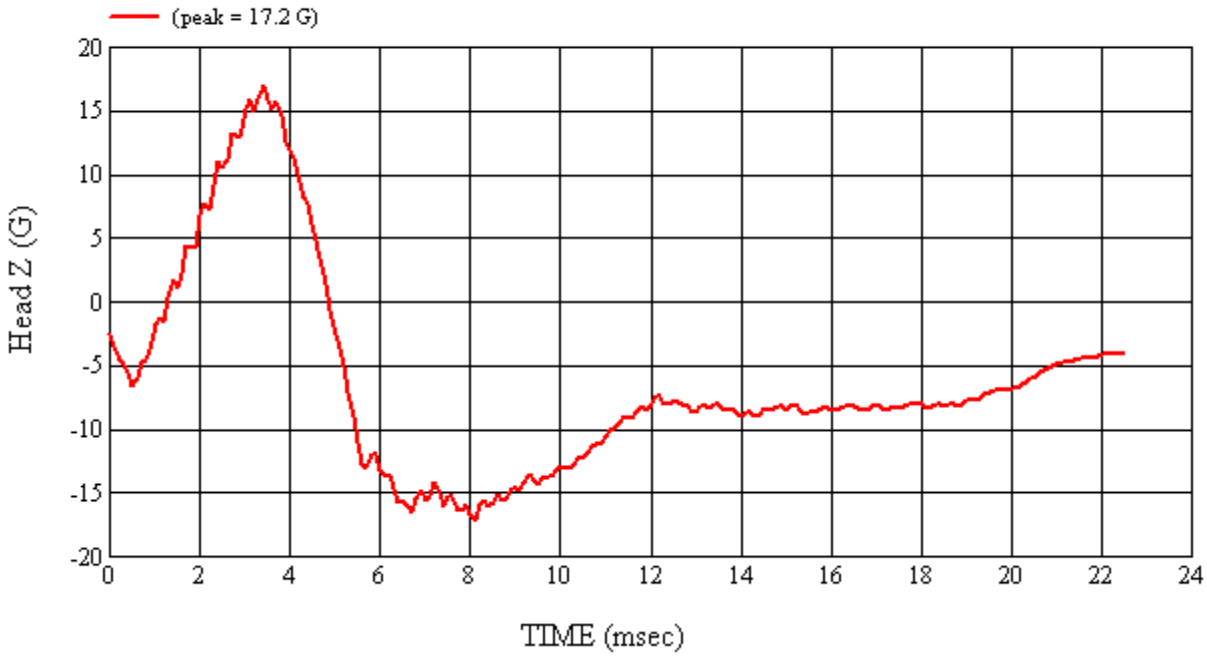
MGA Test #: U11349 Target Location: SR2B, Right Side Test Date: 7/29/2011

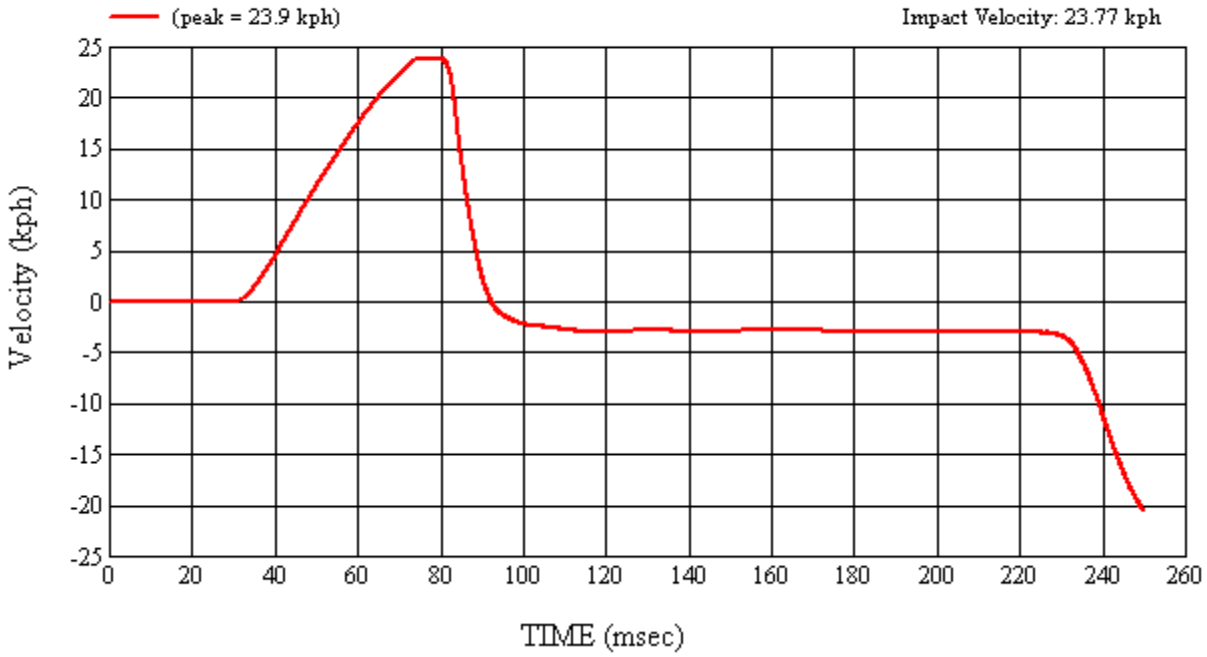


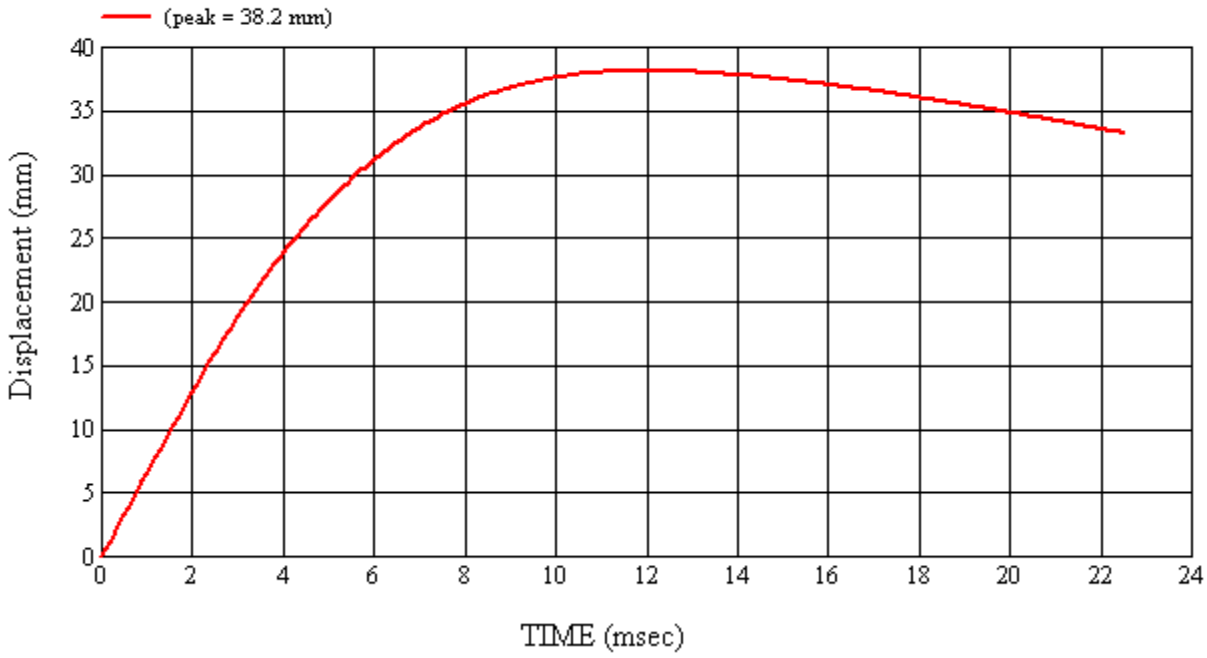



(peak = 99.6 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 7.7 G)
Head Y (G)
8
7
6
5
4
3
2
1
0
-1
-2
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 17.2 G)
Head Z (G)
20
15
10
5
0
-5
-10
-15
-20
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 23.9 kph)
Impact Velocity: 23.77 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
-15
-20
-25
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 38.2 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


CC5200
U11346
LEFT UR1
H/V 270/50
mga
Impact Testing
G11I7-001.14
7/28/2011
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
U11346
PRE TEST


UR1
BPI
CC5200
U11346
LEFT UR1
H/V 270/50
mga
Impact Testing
G11I7-001.14
7/28/2011
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
U11346
PRE TEST


CC5200
U11346
LEFT UR1
H/V 270/50
mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
U11346
POST TEST


UR1
SR2A
mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
U11346
POST TEST


BP1
UR1
SR2B
SR2A
EXIT


mga
Impact Testing
7/28/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
U11346
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Target (Vehicle Side): UR1Left

MGA Test Reference No.:U11346

Approach Horizontal Angles:270º

Approach Vertical Angles:50º

Additional Description:@ SR2B

Test Number:#4

Temperature:22.9C

Humidity:64.6%

Time of Test:3:06:23 PM

FMH Serial No:[035]

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
560	522	7.8	23.5	37	7 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-95.8	1.07	1.07
Y	6	J22664	94.2	0.85	0.85
Z	7	J35924	92.8	0.94	0.94

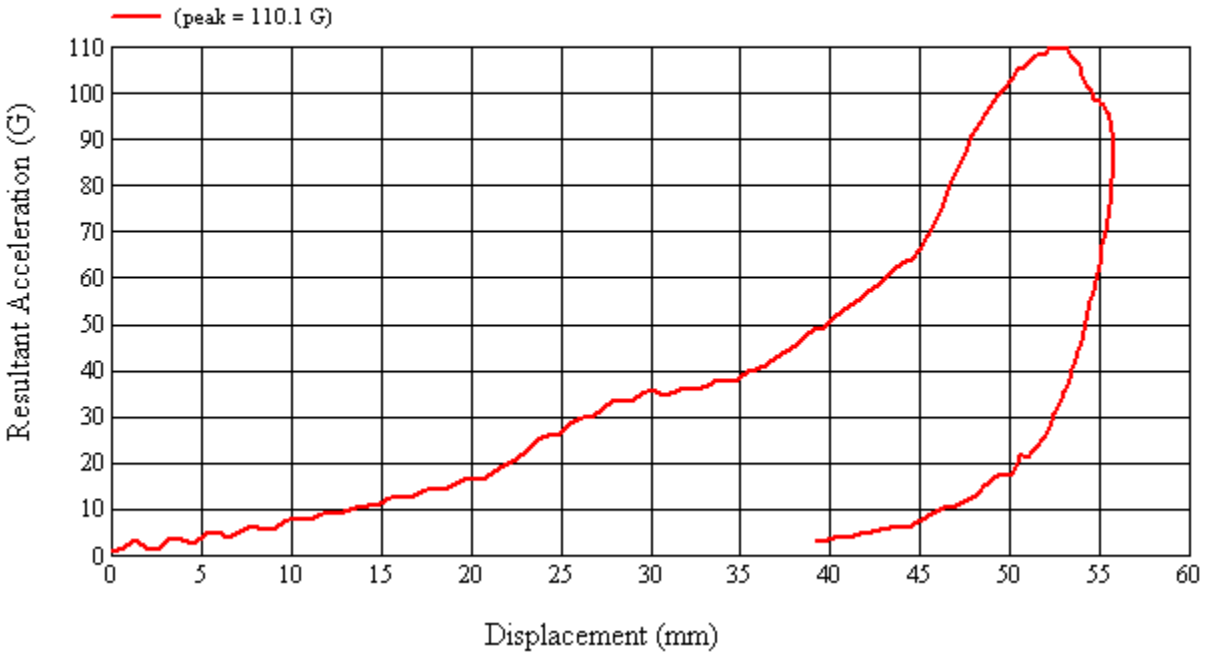
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

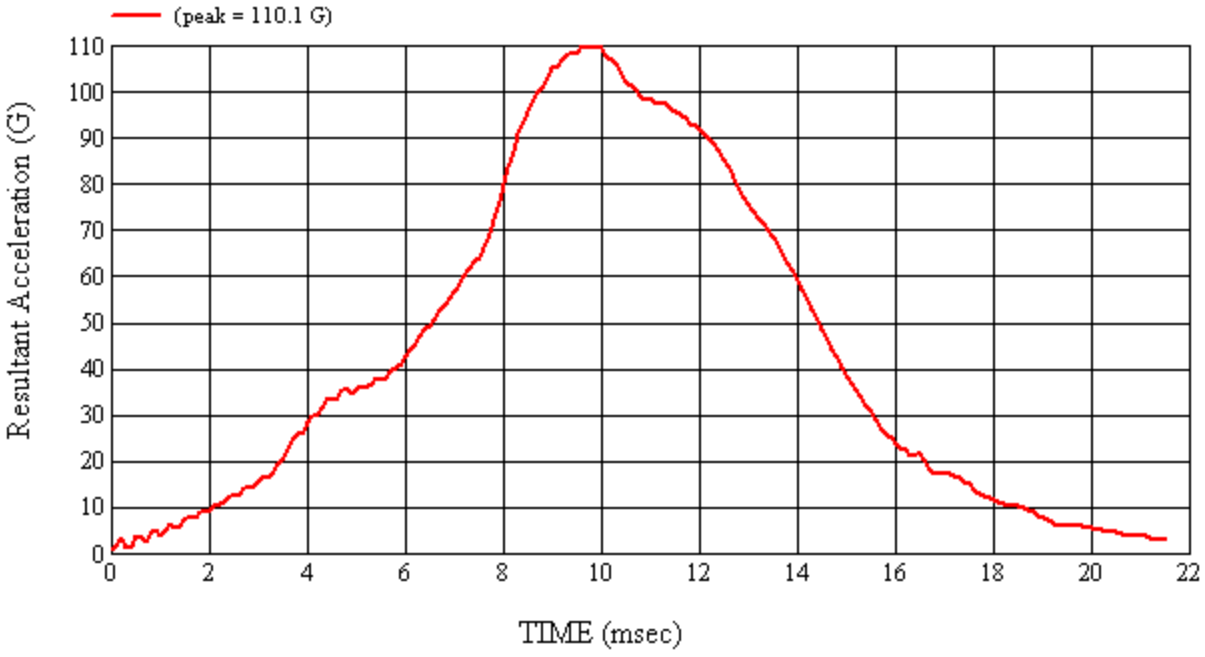
Headliner deformation, dislodged trim, sunglasses holder opened

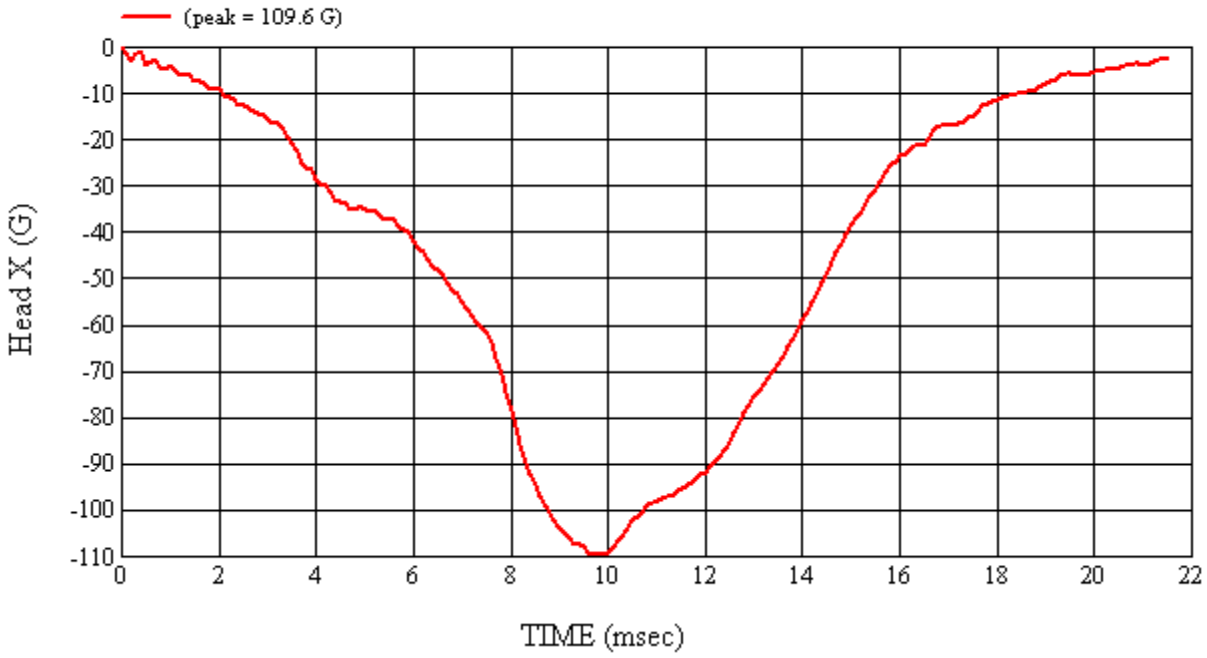
Recorded By: _____ Approved By*: _____ Date: 7/28/2011

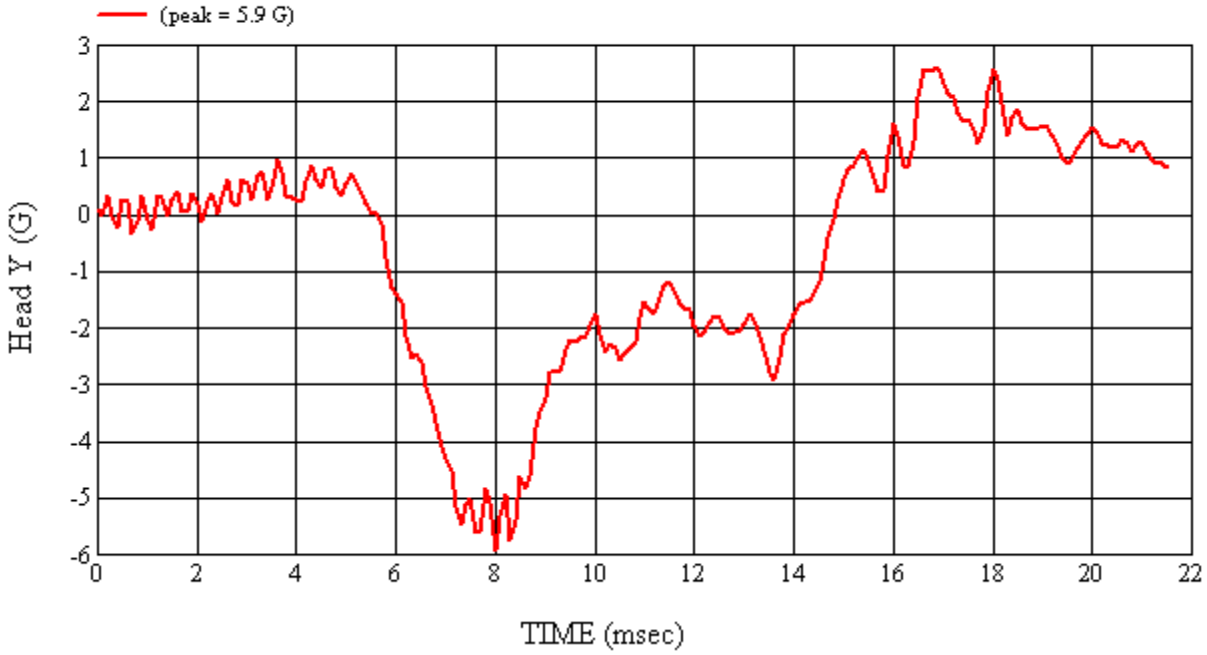
*Only necessary for NHTSA (Government) Compliance testing.

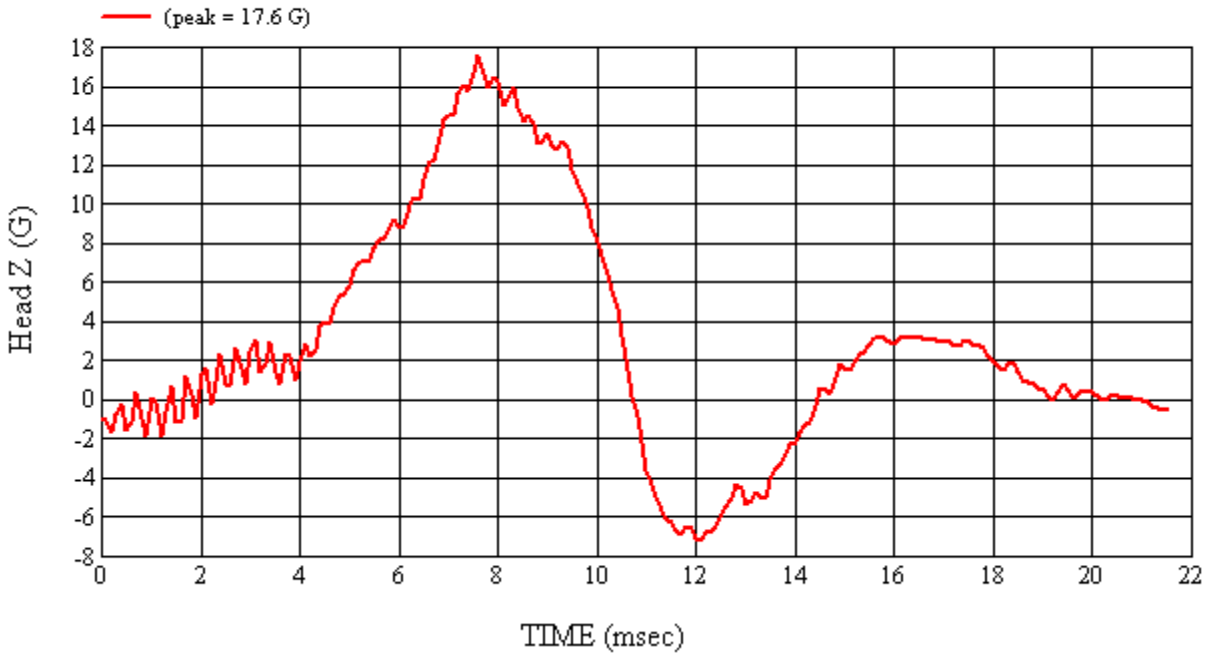
MGA Test #: U11346 Target Location: UR1, Left Side Test Date: 7/28/2011

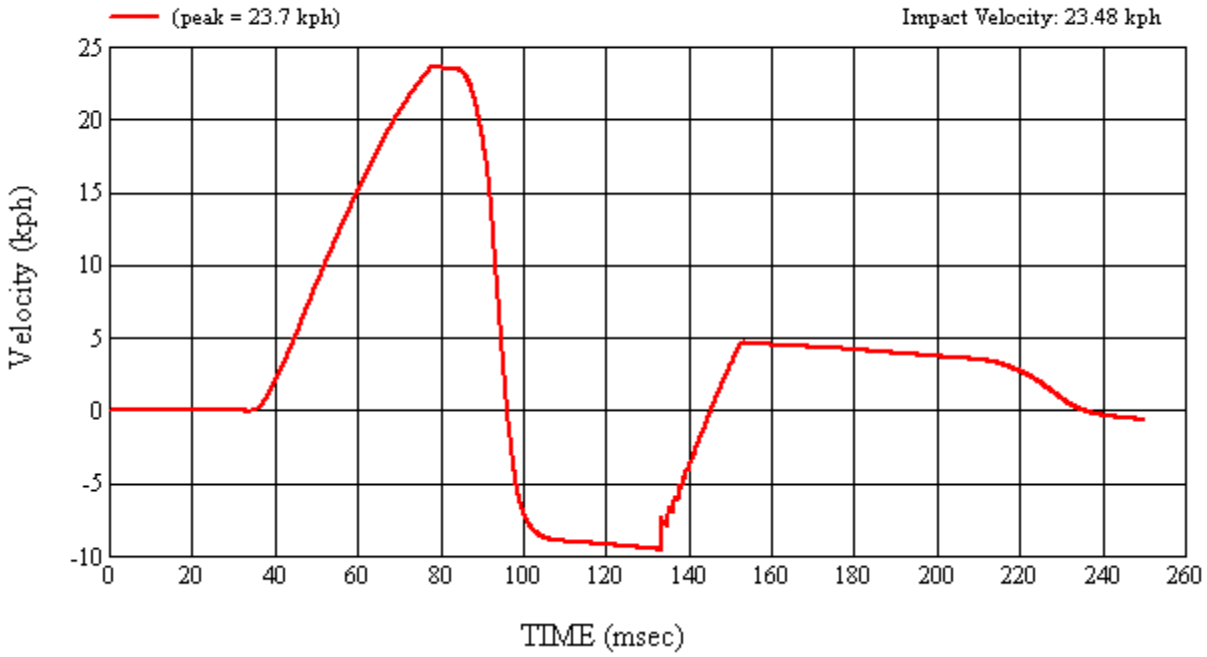


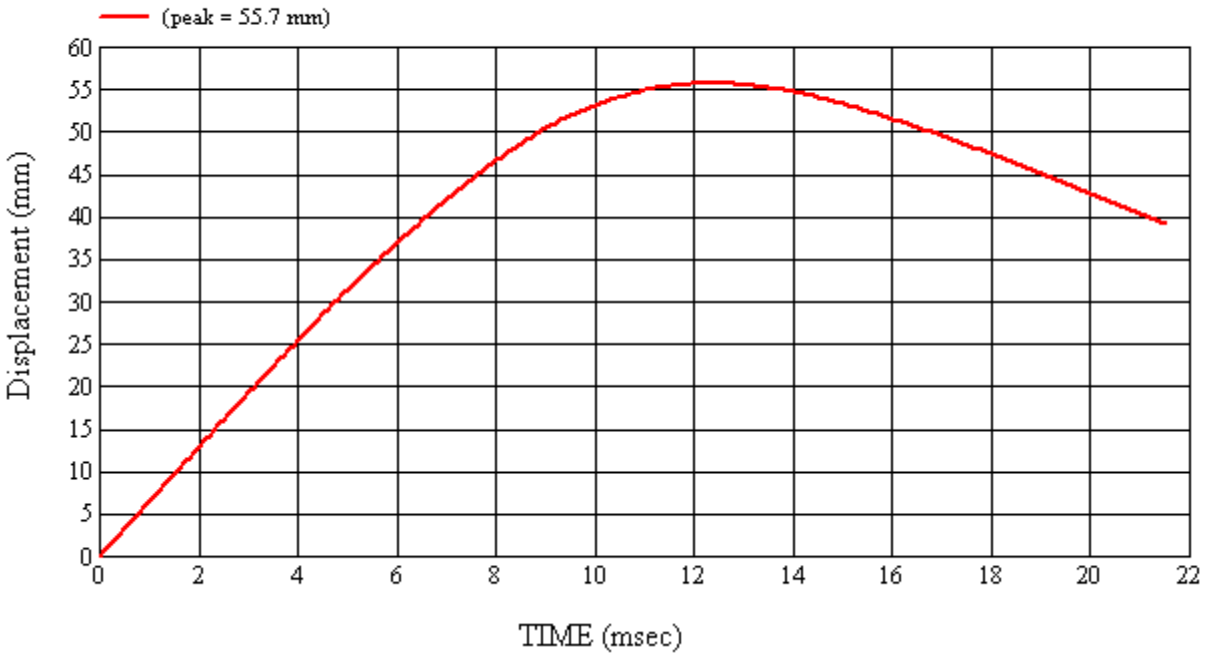


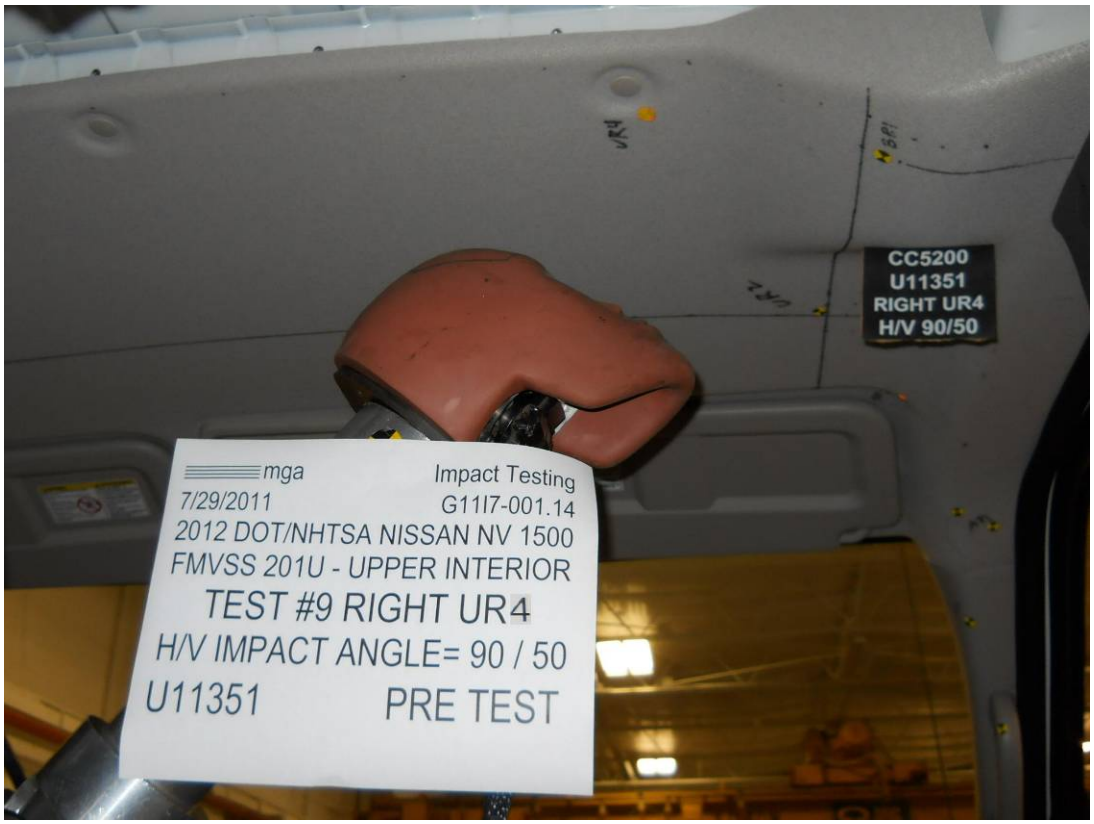

(peak = 109.6 G)
Head X (G)
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 5.9 G)
Head Y (G)
3
2
1
0
-1
-2
-3
-4
-5
-6
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 17.6 G)
Head Z (G)
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 23.7 kph)
Impact Velocity: 23.48 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)

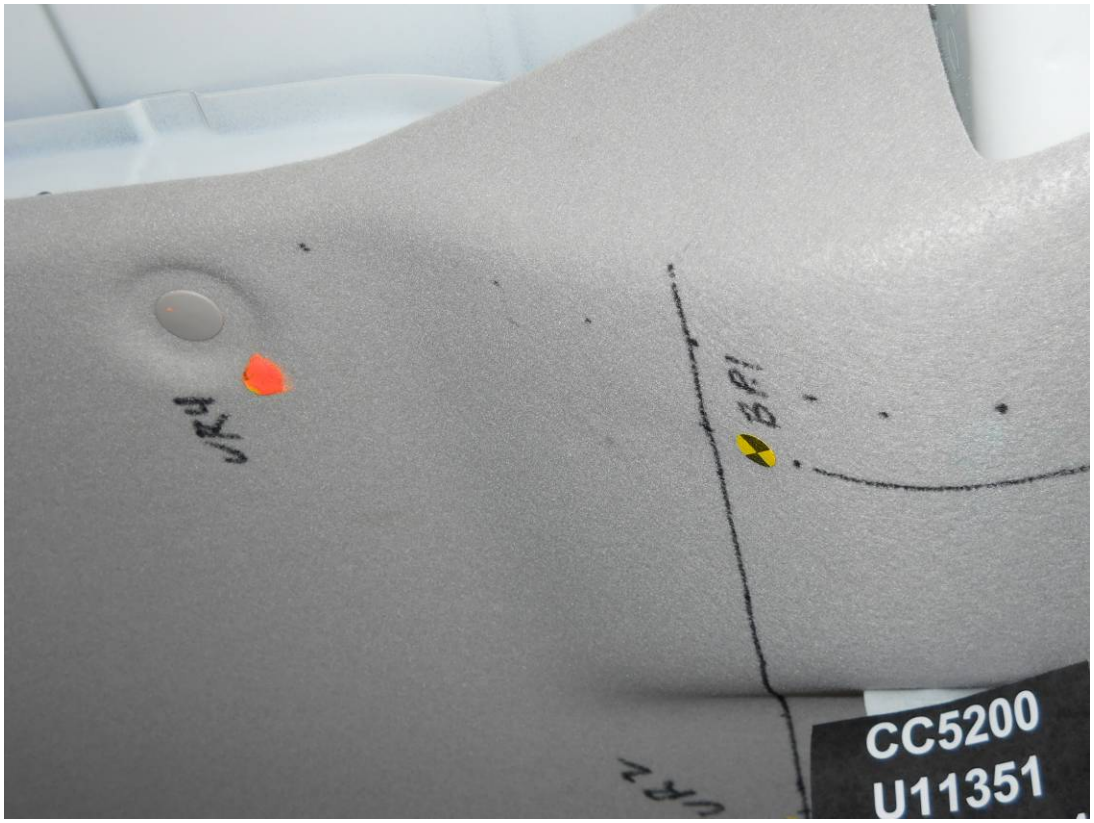

(peak = 55.7 mm)
Displacement (mm)
60
55
50
45
40
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


CC5200
U11351
RIGHT UR4
H/V 90/50
mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U11351
PRE TEST


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U11351
PRE TEST


CC5200
U11351
RIGHT UR4
H/V 90/50
mga
7/29/2011
Impact Testing
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U11351
POST TEST


mga
7/29/2011
Impact Testing
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U11351
POST TEST


CC5200
U11351


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U11351
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Target (Vehicle Side): UR4Right

MGA Test Reference No.:U11351

Approach Horizontal Angles:90º

Approach Vertical Angles:50º

Additional Description:@ BP

Test Number:#9

Temperature:22.9C

Humidity:63.8%

Time of Test:11:54:25 AM

FMH Serial No:[038]

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
578	546	7.4	23.6	40	4 Right

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J22700	-96.4	1.07	1.07
Y	6	J36197	108.7	0.85	0.85
Z	7	J36353	99.1	0.94	0.94

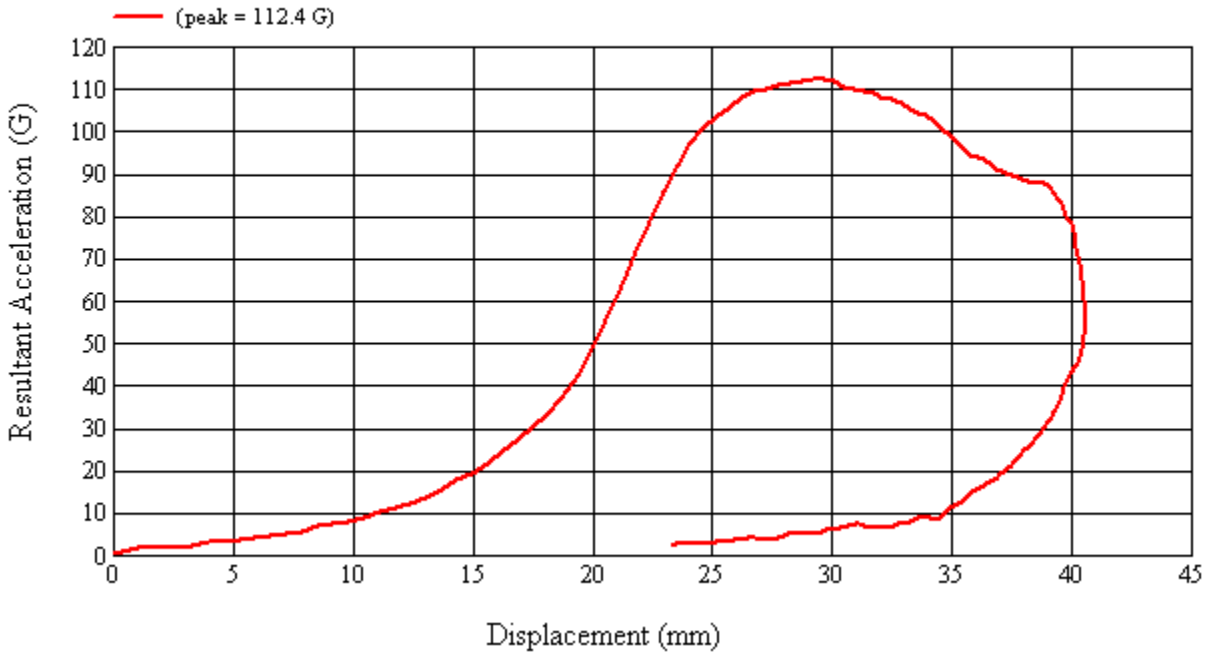
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

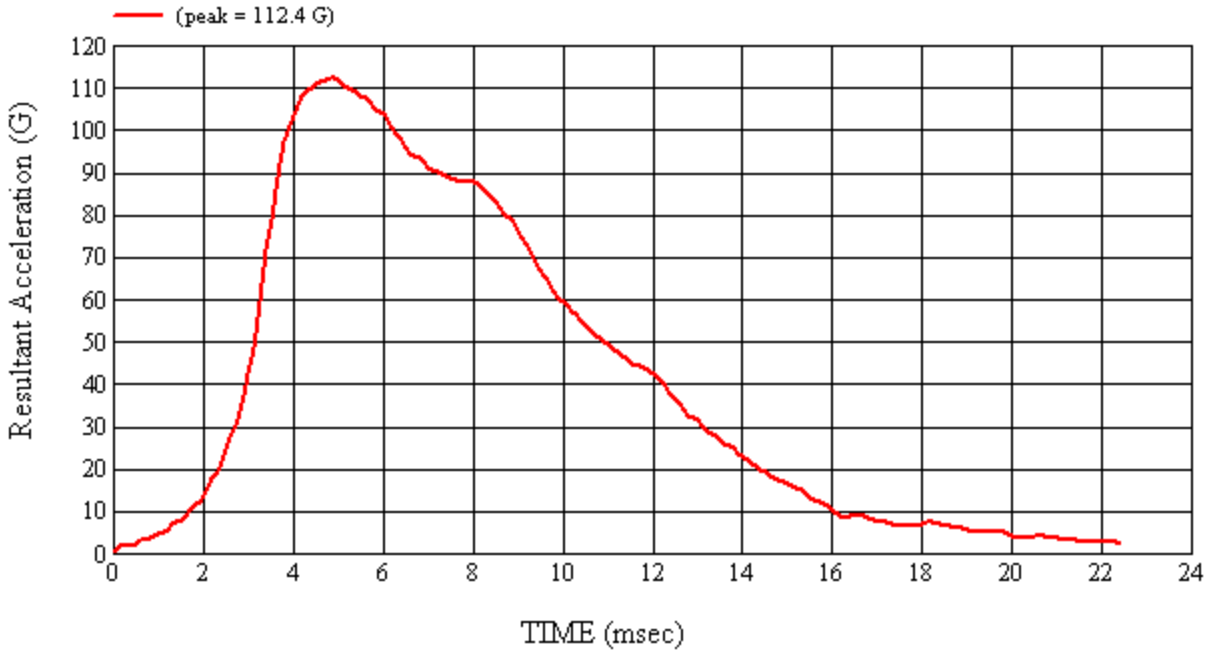
Headliner retaining fastener removed, sunglasses holder opened

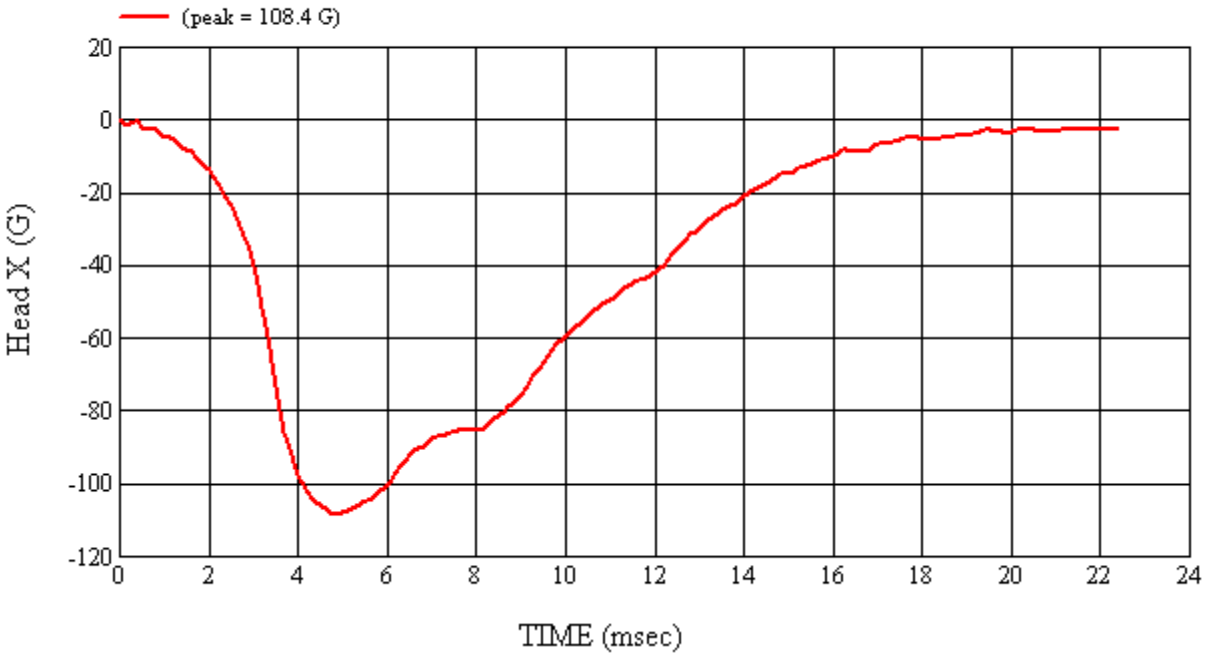
Recorded By: _____ Approved By*: _____ Date: 7/29/2011

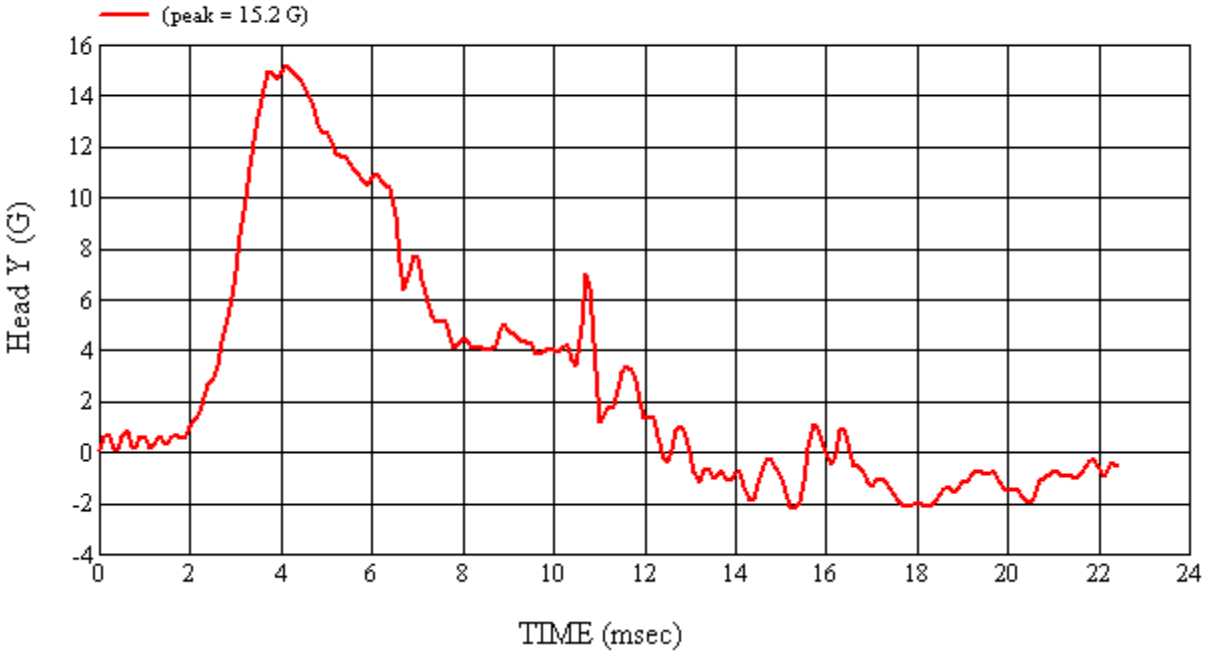
*Only necessary for NHTSA (Government) Compliance testing.

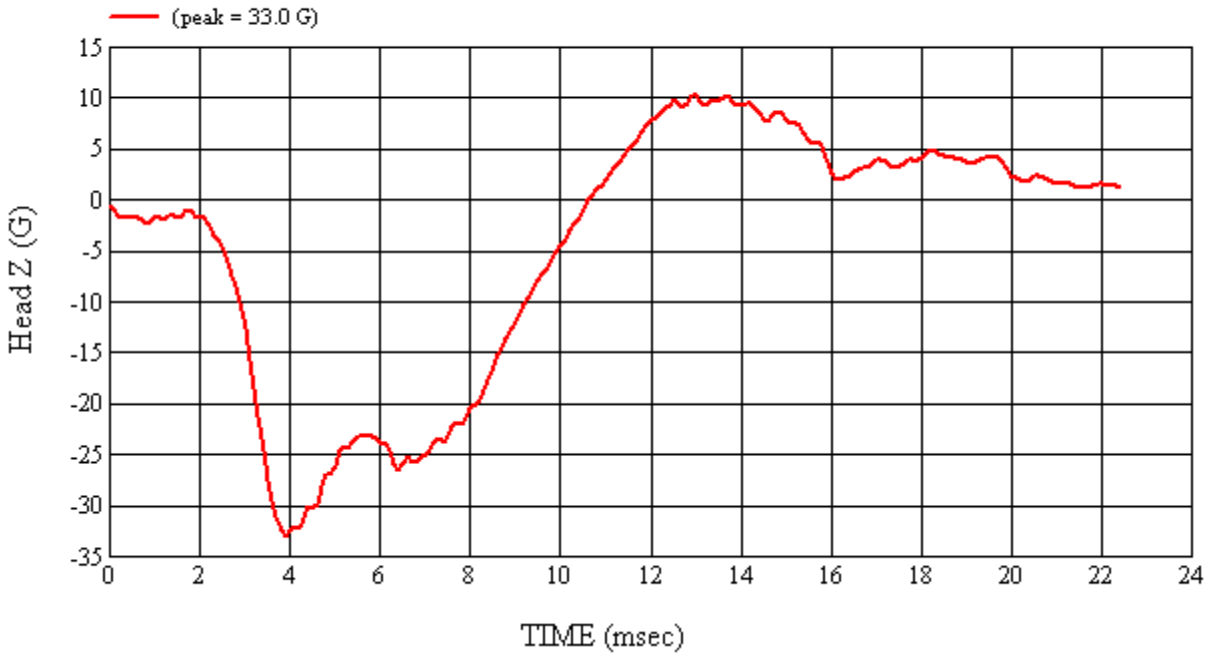
MGA Test #: U11351 Target Location: UR4, Right Side Test Date: 7/29/2011

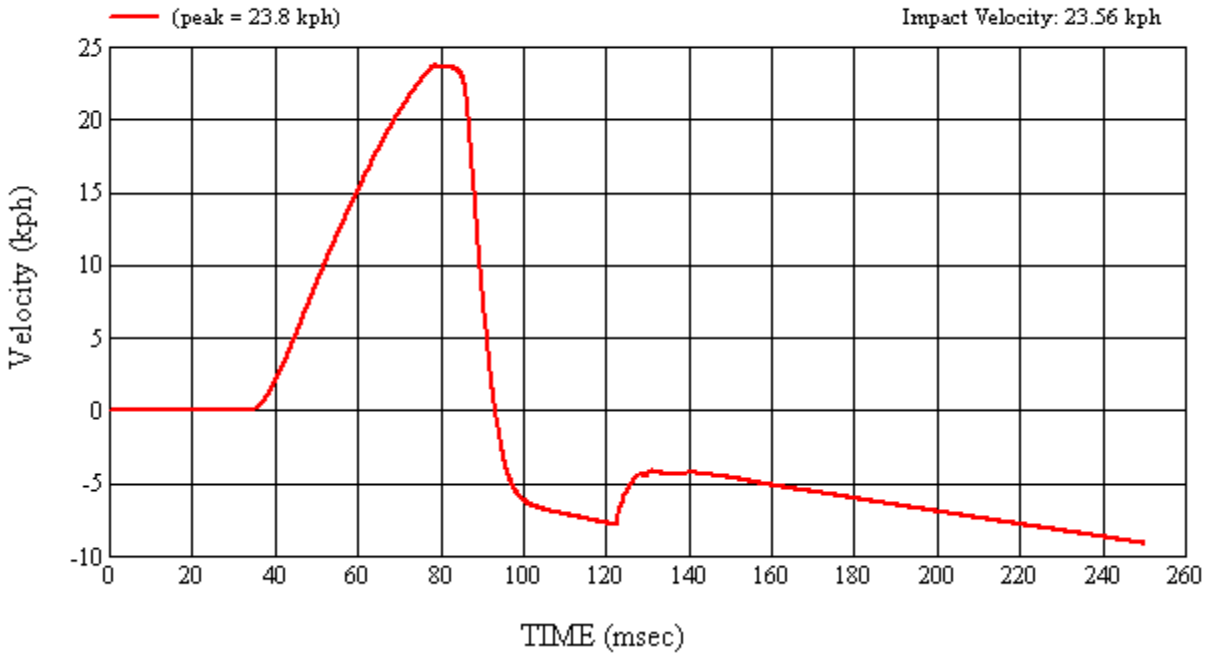


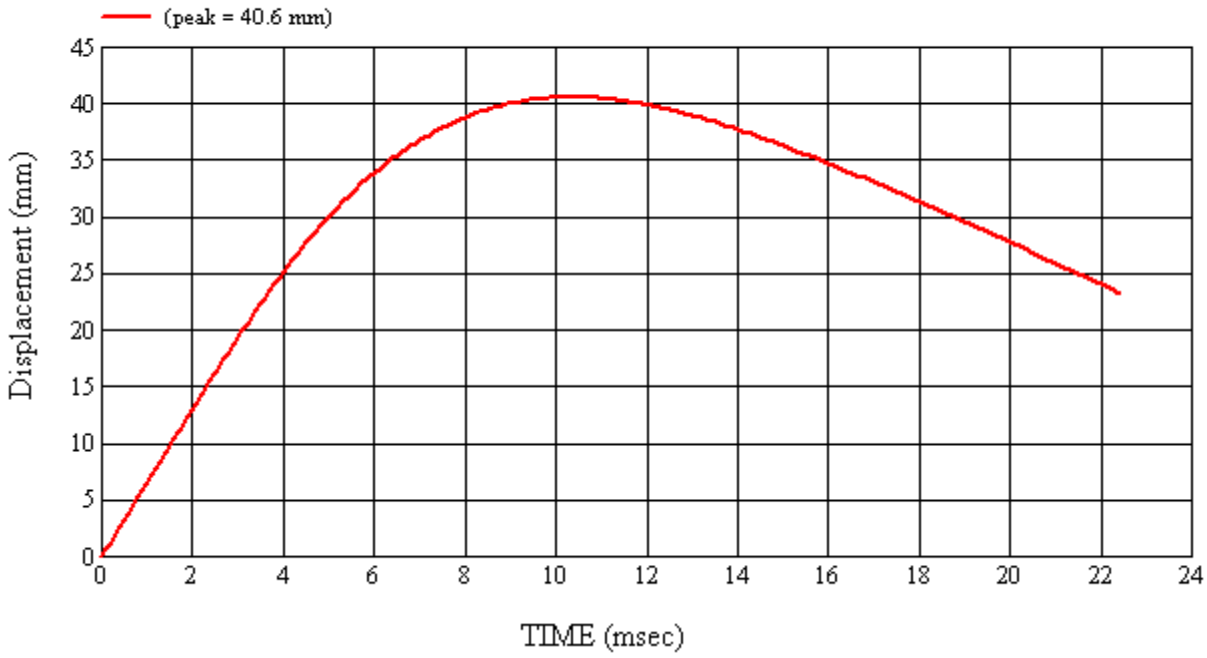


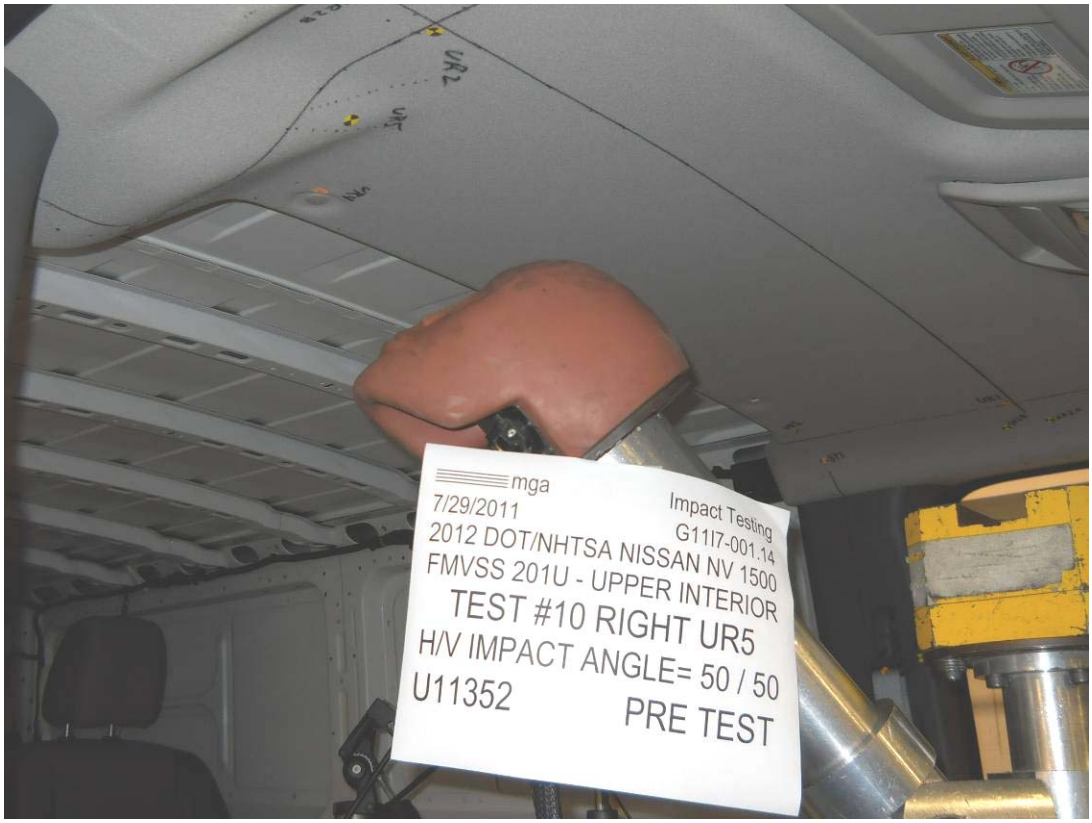

(peak = 108.4 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 15.2 G)
Head Y (G)
16
14
12
10
8
6
4
2
0
-2
-4
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 33.0 G)
Head Z (G)
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)


(peak = 23.8 kph)
Impact Velocity: 23.56 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 40.6 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
0
2
4
6
8
10
12
14
16
18
20
22
24
TIME (msec)

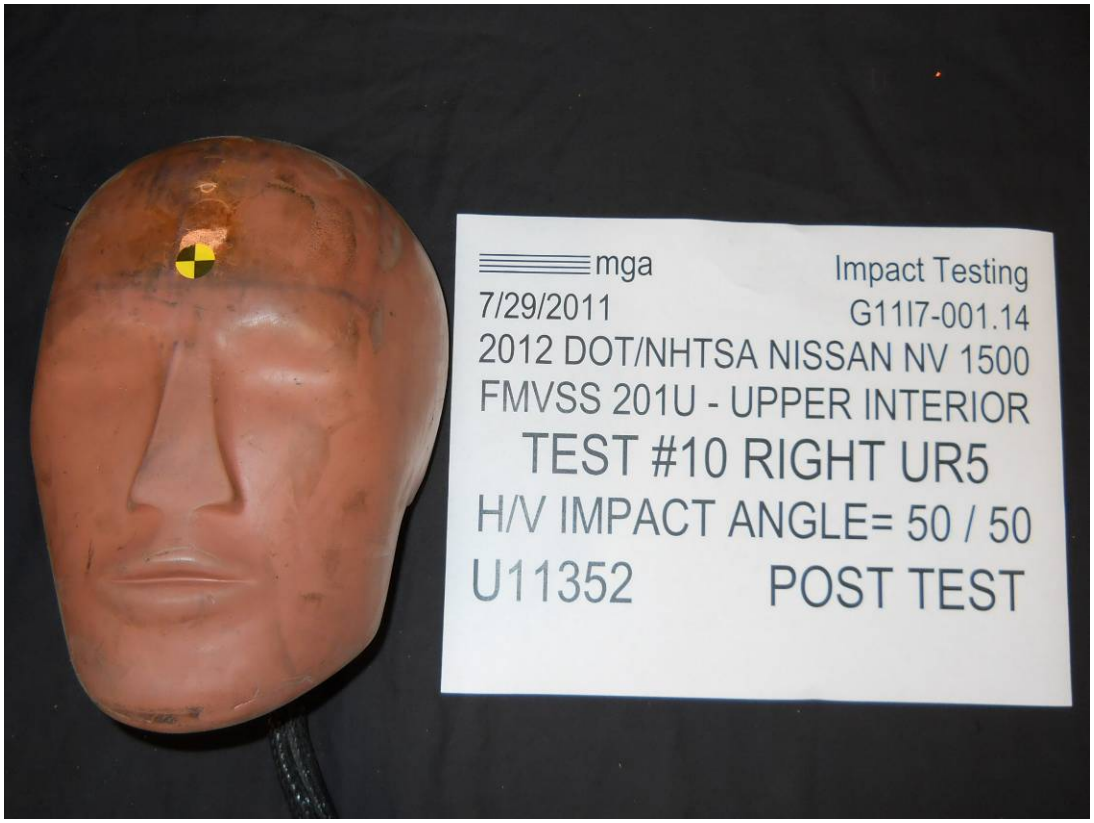

mga
7/29/2011
Impact Testing
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT UR5
H/V IMPACT ANGLE= 50 / 50
U11352
PRE TEST


UR2
UR5
FR2A
FR2B
BPI
mga
7/29/2011
Impact Testing
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT UR5
H/V IMPACT ANGLE= 50 / 50
U11352
PRE TEST


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT UR5
H/V IMPACT ANGLE= 50 / 50
U11352
POST TEST


CC5200
U11352
RIGHT UR5
H/V 50/50
mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT UR5
H/V IMPACT ANGLE= 50 / 50
U11352
POST TEST


UR2
UR1
UR4


mga
Impact Testing
7/29/2011
G11I7-001.14
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT UR5
H/V IMPACT ANGLE= 50 / 50
U11352
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL:2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

Target (Vehicle Side): UR5Right

MGA Test Reference No.:U11352

Approach Horizontal Angles:50º

Approach Vertical Angles:50º

Additional Description:@ BP

Test Number:#10

Temperature:23.6C

Humidity:60.8%

Time of Test:3:02:33 PM

FMH Serial No:[035]

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
241	98	35.5	23.8	7	5 Left

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35919	-95.8	1.07	1.07
Y	6	J22664	94.2	0.85	0.85
Z	7	J35924	92.8	0.94	0.94

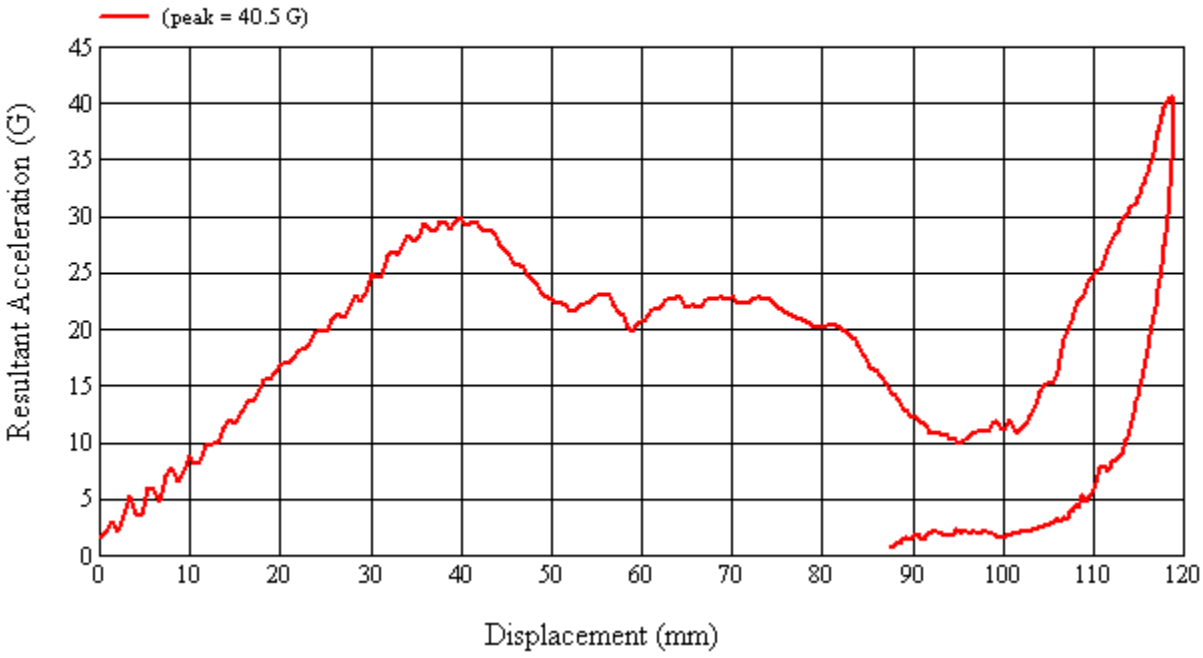
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

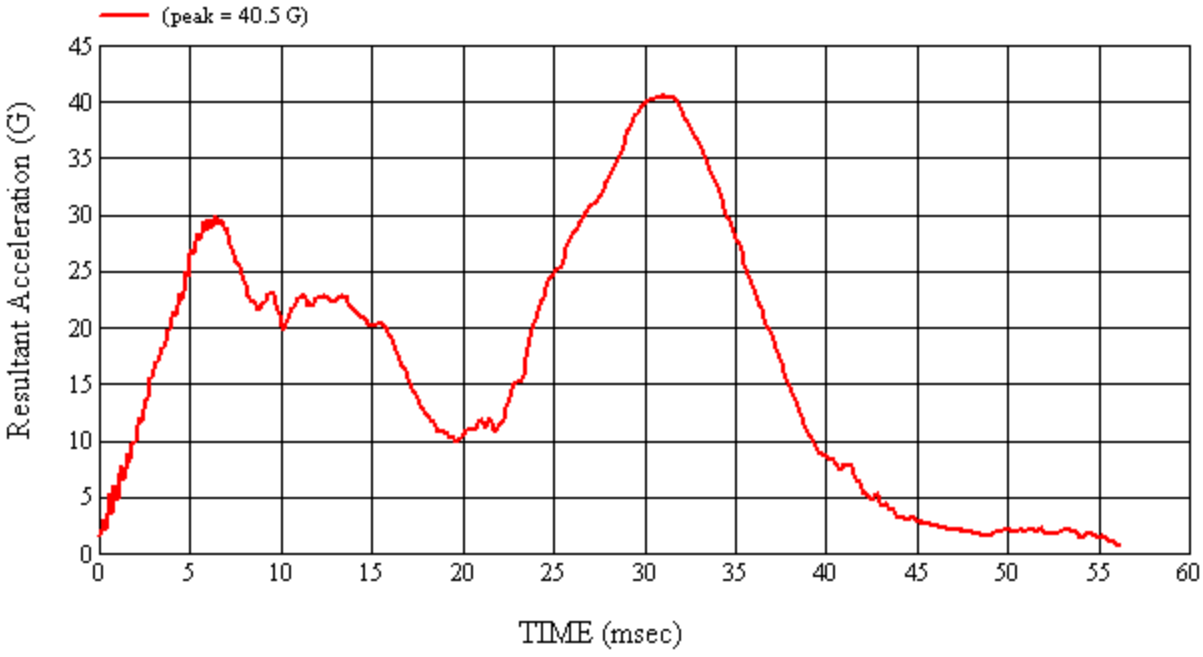
Headliner deformation, dislodged headliner, headliner retaining fastener removed

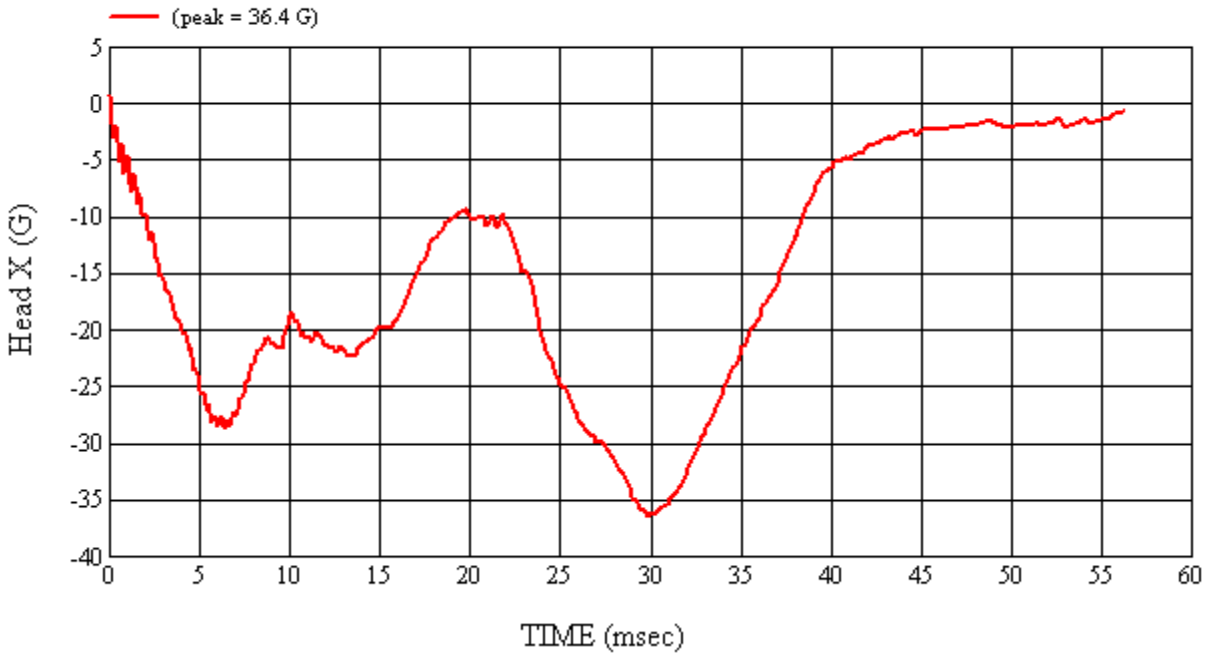
Recorded By: _____ Approved By*: _____ Date: 7/29/2011

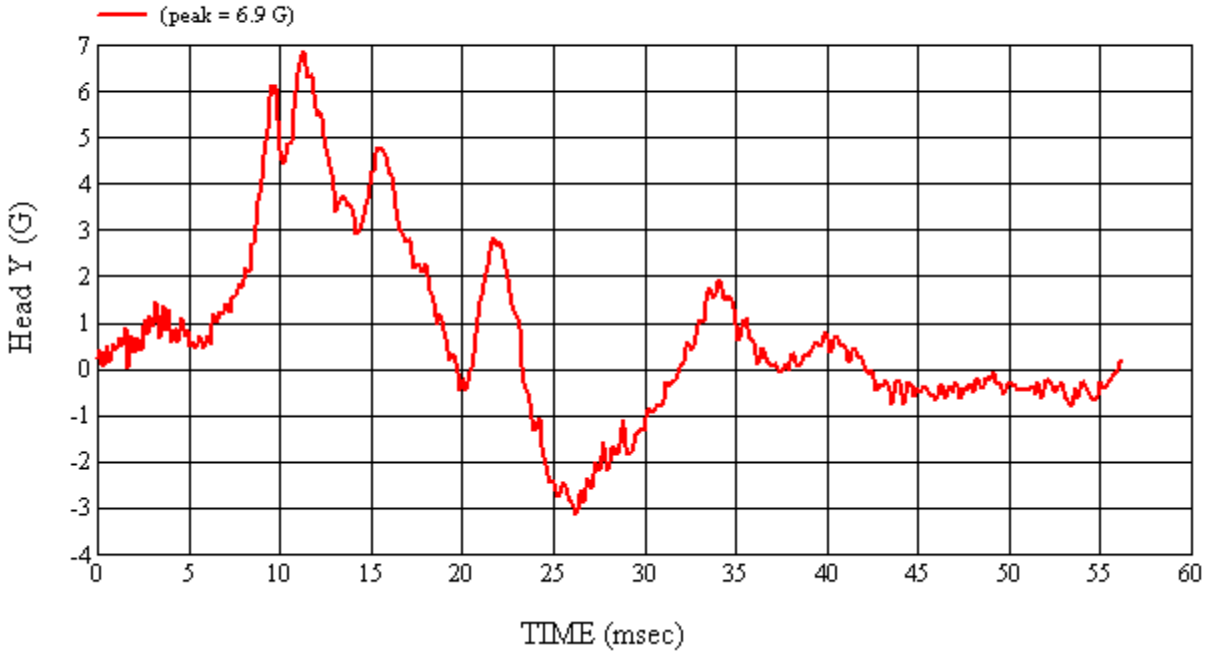
*Only necessary for NHTSA (Government) Compliance testing.

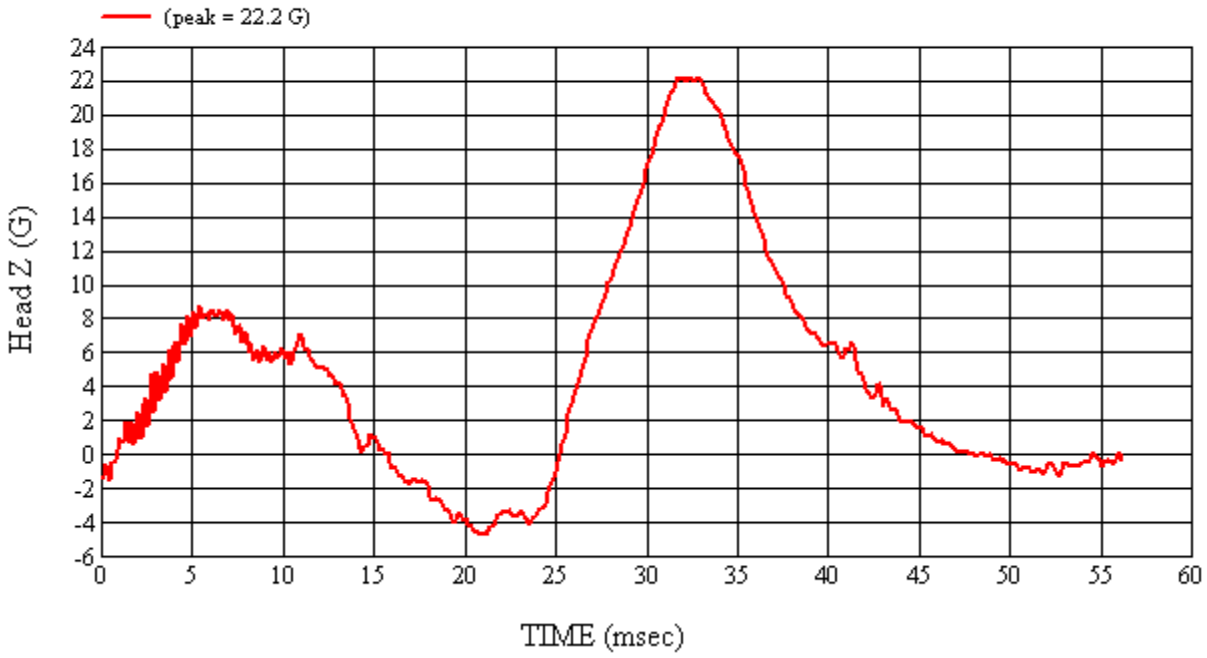
MGA Test #: U11352 Target Location: UR5, Right Side Test Date: 7/29/2011

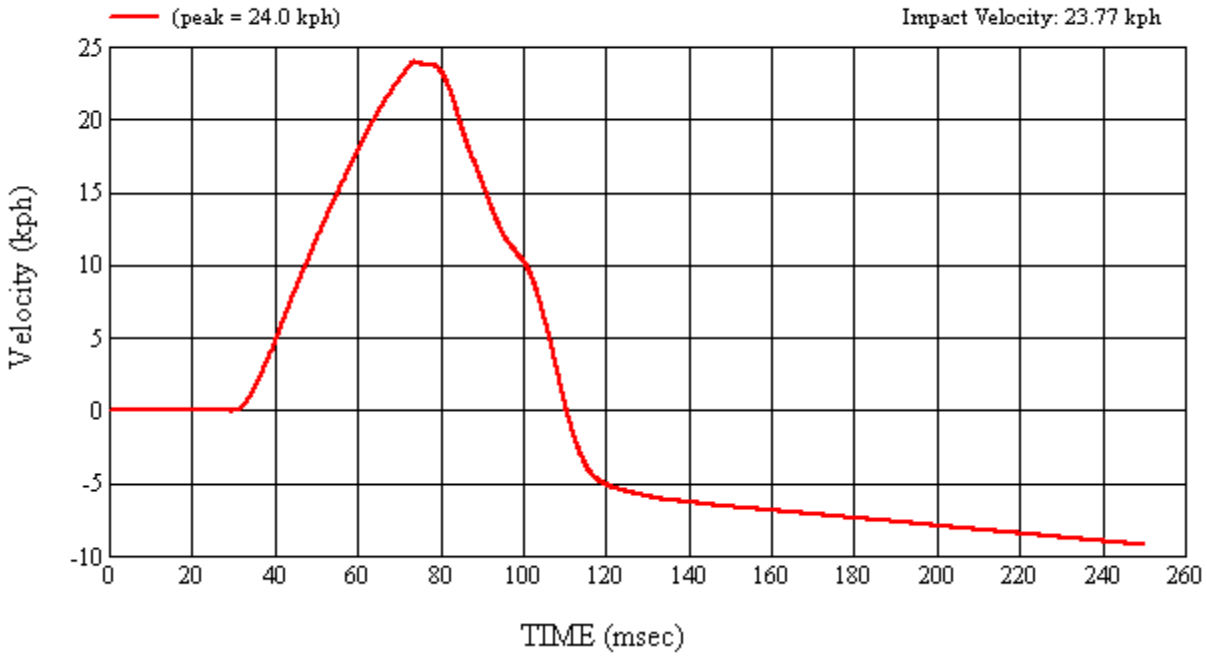


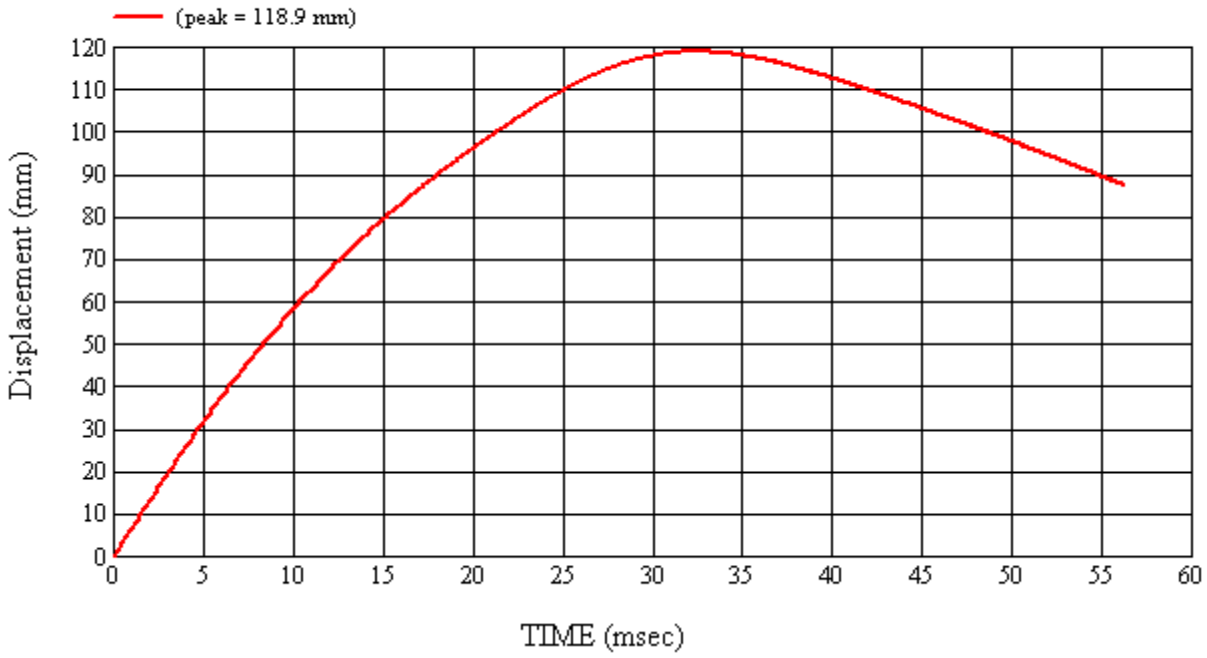



(peak = 36.4 G)
Head X (G)
5
0
-5
-10
-15
-20
-25
-30
-35
-40
0
5
10
15
20
25
30
35
40
45
50
55
60
TIME (msec)


(peak = 6.9 G)
Head Y (G)
7
6
5
4
3
2
1
0
-1
-2
-3
-4
0
5
10
15
20
25
30
35
40
45
50
55
60
TIME (msec)


(peak = 22.2 G)
Head Z (G)
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
0
5
10
15
20
25
30
35
40
45
50
55
60
TIME (msec)


(peak = 24.0 kph)
Impact Velocity: 23.77 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 118.9 mm)
Displacement (mm)
120
110
100
90
80
70
60
50
40
30
20
10
0
0
5
10
15
20
25
30
35
40
45
50
55
60
TIME (msec)

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

The following section lists the test equipment for the compliance test series. Items marked with an asterisk are calibrated by an external lab. An additional summary table is given for the pre and post-test calibration data for the Free Motion Headforms. The temperature trace to confirm testing was conducted between 66ºF and 78ºF (19ºC – 26ºC) is included in Appendix A. Calibration certificates can be found in Appendix B.

TABLE 4-1 LIST OF ITEMS USED

ITEM	MANUFACTURER NAME	MODEL #	FUNCTION OF ITEM	ACCURACY	CAL. INTERNAL
Head Drop Tower (includes test frame and DAS)	MGA Research Corp.	MGA-100-DC	FMH Calibration	N/A	N/A
Accelerometers	Endevco	7264-2000	Acceleration Data	±0.5%	6 months
FMVSS 201U Test Frame (includes the propulsion control system, actuator, test frame, and DAS)	MGA Research Corp.	MGA-100-FMH	Test System	N/A	N/A
Free Motion Headforms	UTAMA UTAMA UTAMA	035 037 038	Test Device	N/A	Pre and Post-Test Series
High Speed Video	Vision Research	Miro Ex4	Record Event	N/A	N/A
*FARO™ *FARO™	Faro Technologies Faro Technologies	G10020001619 S08059801273	Targeting Targeting	0.1 mm 0.1 mm	Annual Annual
Measuring Devices: - Tape Measure - Plumb Bobs - Digital Protractor	 Stanley N/A Mitutoyo	 TPM121 -- MGA00712	 Measurement Targeting FMH setup Horizontal Measurement	 1 mm N/A 0.5°	Annual
*Temperature Recorder	Dickson	MGA00894	Record Temperature and Humidity	± 1°C ± 1% RH	Annual
* Scale	Detecto	MGA00783	Weigh FMH Head	± 0.01 lb	Annual
*Vehicle Scale	Intercomp	26032389	Weighing Vehicle	± .5 kg	Annual

Each headform was calibrated by an engineer after the headform had soaked in an environment of 66ºF to 78ºF (19ºC to 26ºC) for a period of at least four hours.

Each headform was found to comply with the performance criteria under Part 572L for pre and post-test calibrations. That is, the peak resultant acceleration was between 225 and 275 G's, the peak lateral acceleration was less than 15 G's, the headform weighed between 9.9 and 10.1 lbs., the pulse was determined to be unimodal, and there was no major damage to the headform.

TABLE 4-2 FMH CALIBRATION SUMMARY

FMH Serial #		Headform Calibration Date	Weight (lbs)	Temp (ºC)	% Humidity	Peak Resultant Acceleration (G's)	Peak Lateral Acceleration (G's)	Unimodal
Pre	#035	7/26/2011	9.90	22.8	49.0	246.4	5.5	Yes
Post	#035	8/1/2011	9.90	23.3	58.9	252.9	3.2	Yes
Pre	#037	7/26/2011	9.96	22.8	48.5	254.4	8.0	Yes
Post	#037	8/1/2011	9.96	23.3	57.9	259.5	7.3	Yes
Pre	#038	7/26/2011	9.90	22.9	48.0	257.7	12.0	Yes
Post	#038	8/1/2011	9.90	23.3	58.7	260.4	13.7	Yes

4-1 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

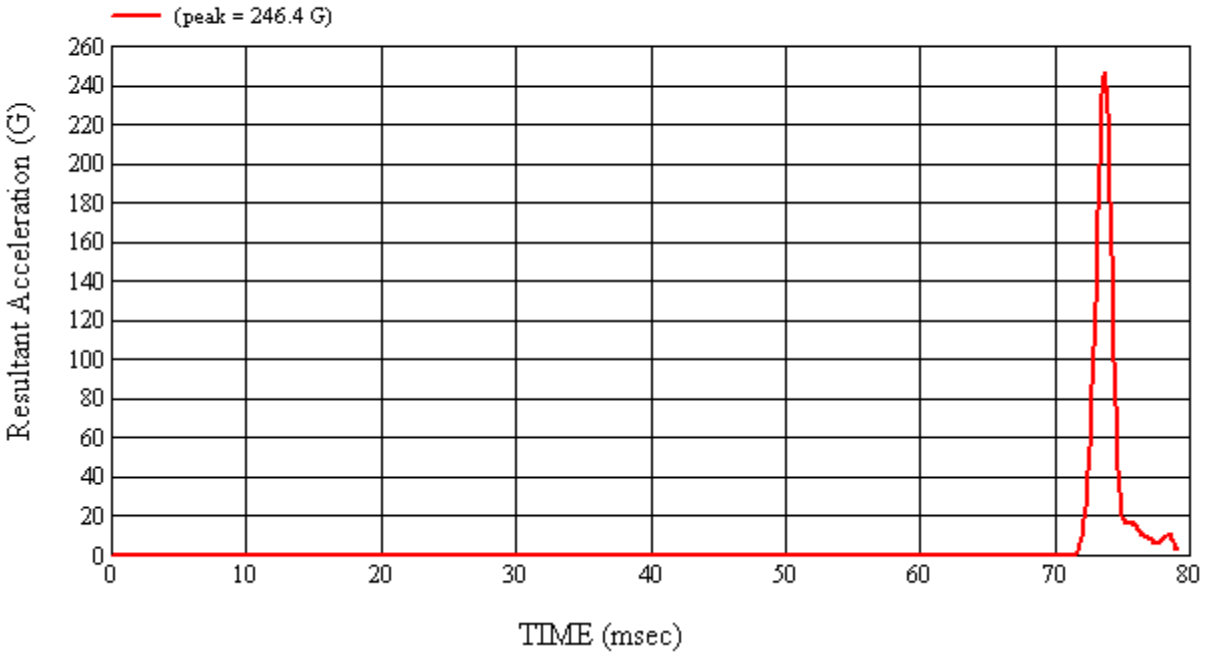
HEADFORM SERIAL NUMBER: 035	CALIBRATION DATE: 7/26/2011 CALIBRATION TIME: 2:33:51 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	22.8
Relative Humidity	10% to 70%	49.0
Peak Resultant Acceleration	225 G's to 275 G's	246.4
Peak Lateral Acceleration	15 G's Maximum	5.5
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J35919	02/04/11	08/04/11
2	ENDEVCO	7264-2000	J22664	02/04/11	08/04/11
3	ENDEVCO	7264-2000	J35924	02/04/11	08/04/11

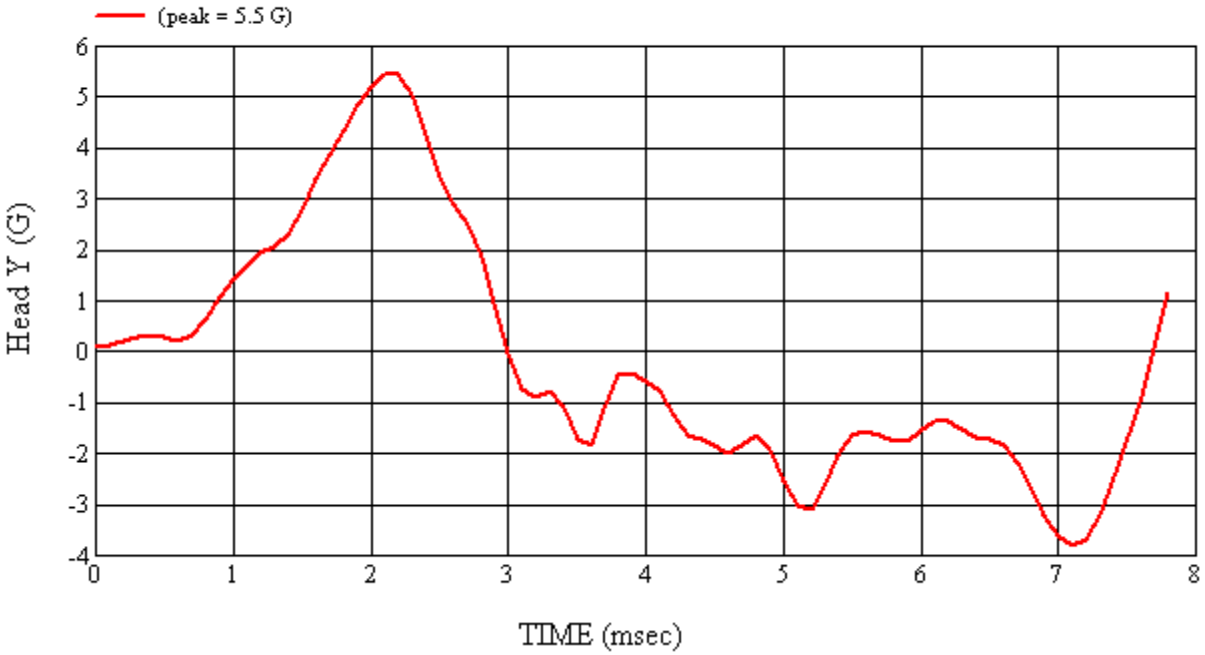
REMARKS:

RECORDED BY: _____ DATE: 7/26/2011

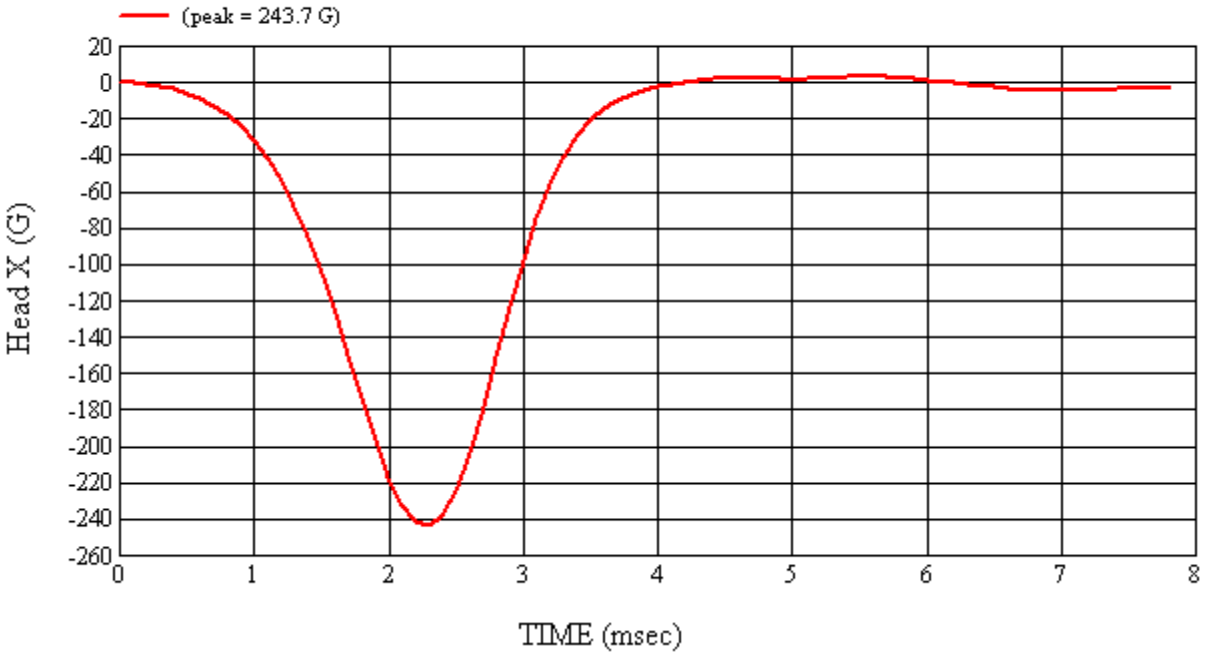
APPROVED BY: _____



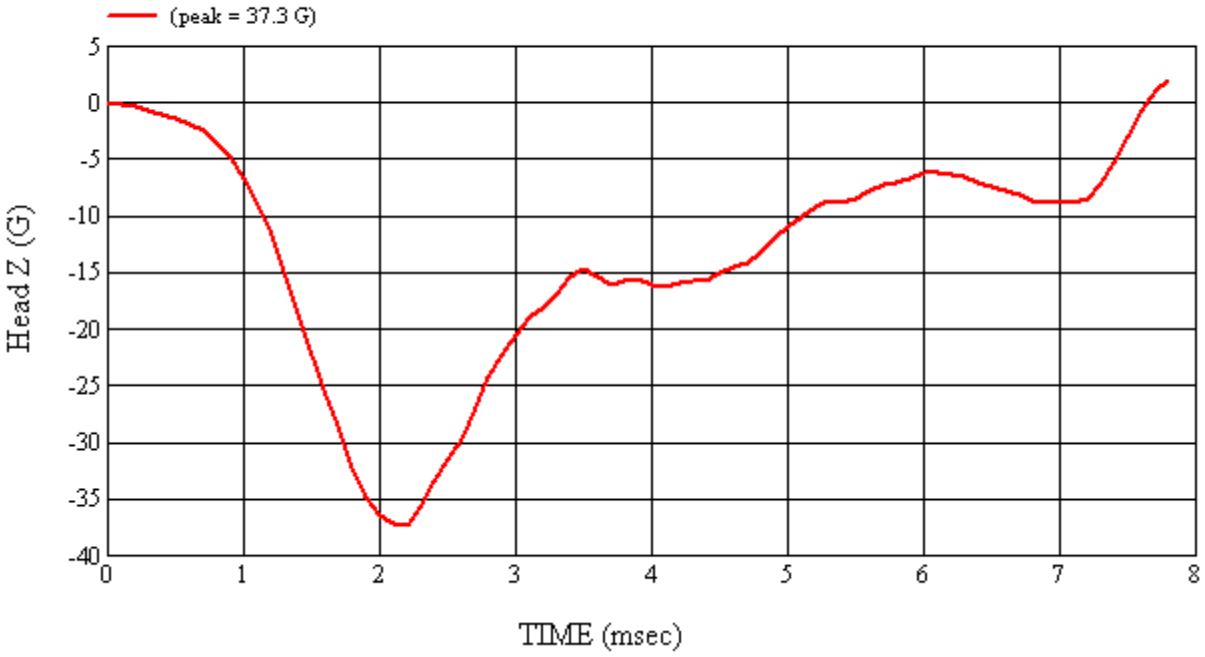
Head 035 (Pre) Calibration #H35045



Head 035 (Pre) Calibration #H35045



Head 035 (Pre) Calibration #H35045



Head 035 (Pre) Calibration #H35045

4-2 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

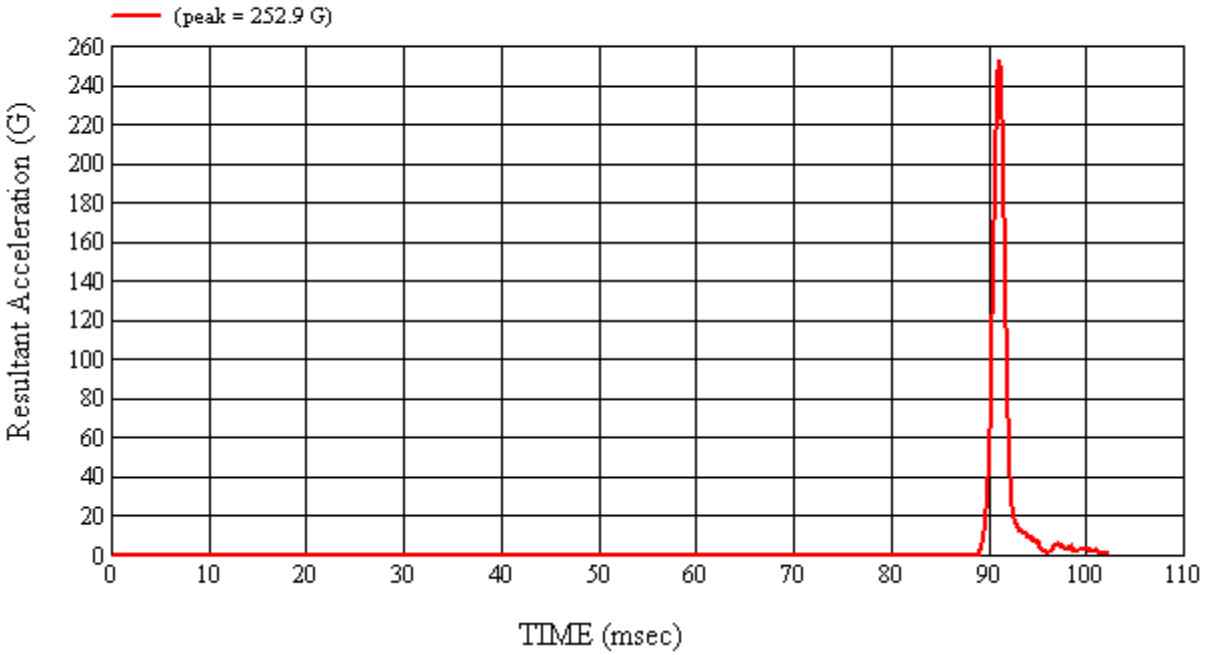
HEADFORM SERIAL NUMBER: 035	CALIBRATION DATE: 8/1/2011 CALIBRATION TIME: 1:09:53 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	23.3
Relative Humidity	10% to 70%	58.9
Peak Resultant Acceleration	225 G's to 275 G's	252.9
Peak Lateral Acceleration	15 G's Maximum	3.2
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J35919	02/04/11	08/04/11
2	ENDEVCO	7264-2000	J22664	02/04/11	08/04/11
3	ENDEVCO	7264-2000	J35924	02/04/11	08/04/11

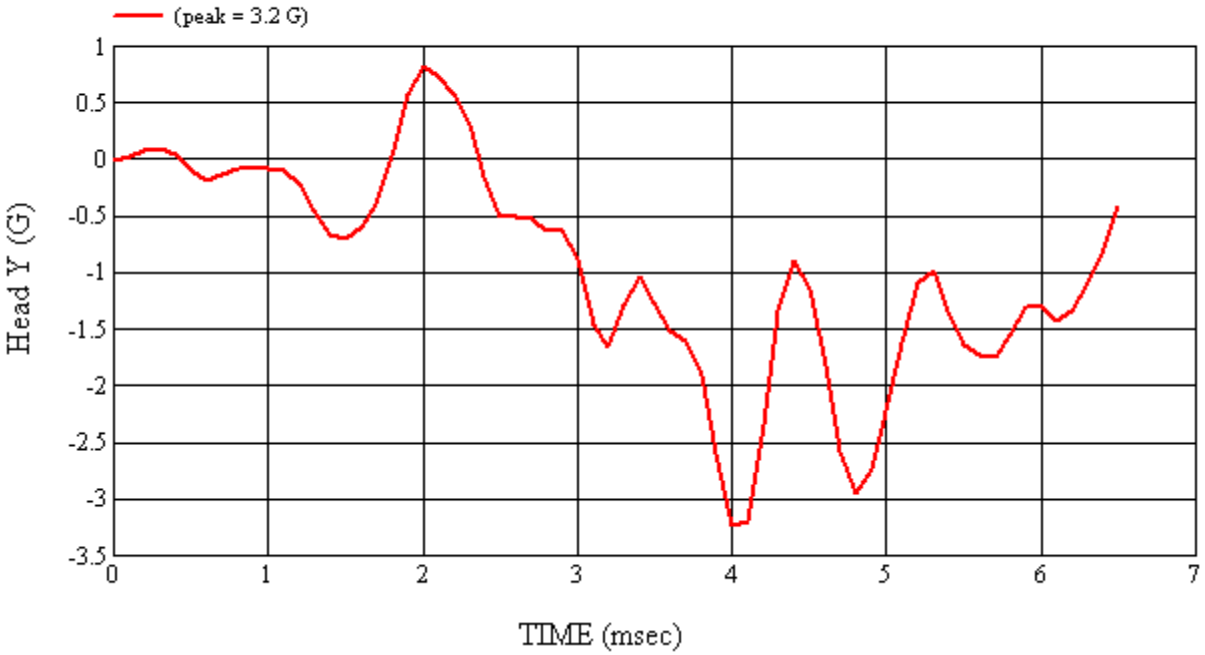
REMARKS:

RECORDED BY: _____ DATE: __8/1/2011____

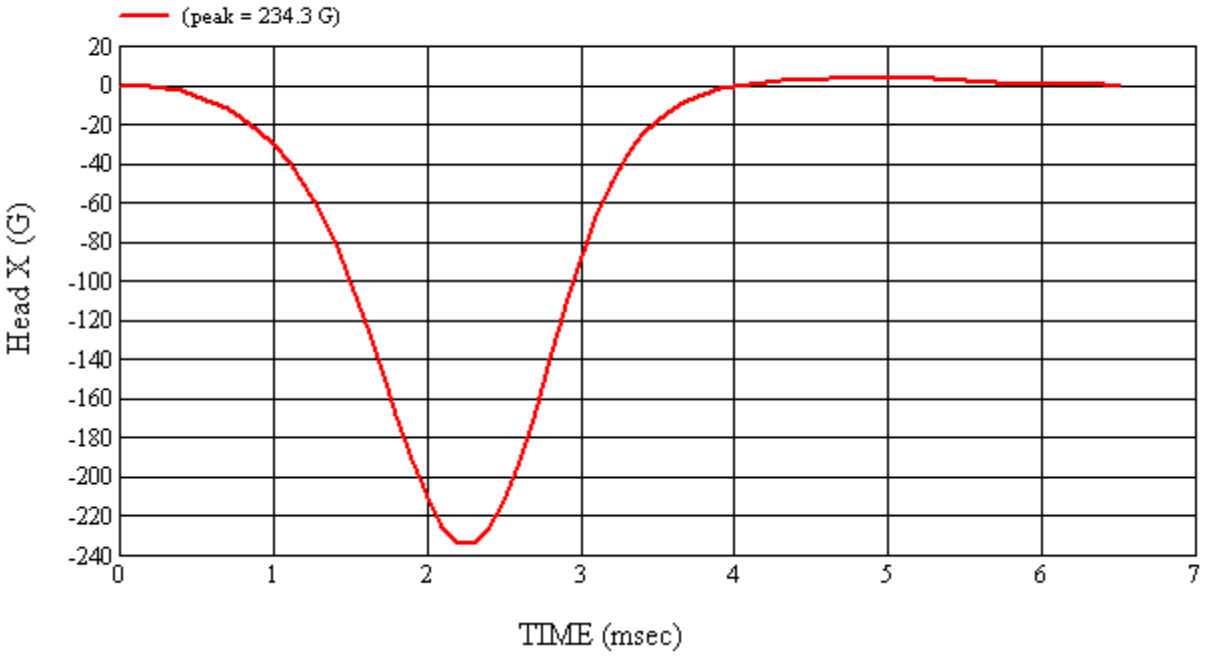
APPROVED BY: _____



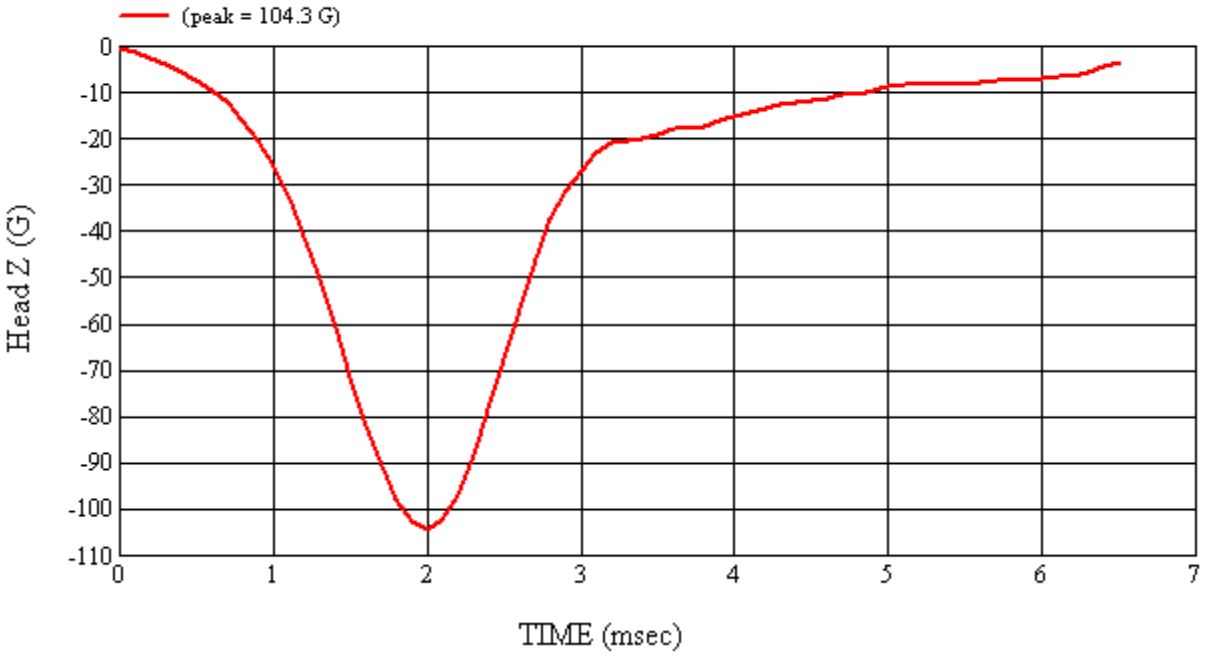
Head 035 (Post) Calibration #H35046



Head 035 (Post) Calibration #H35046



Head 035 (Post) Calibration #H35046



Head 035 (Post) Calibration #H35046

4-3 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

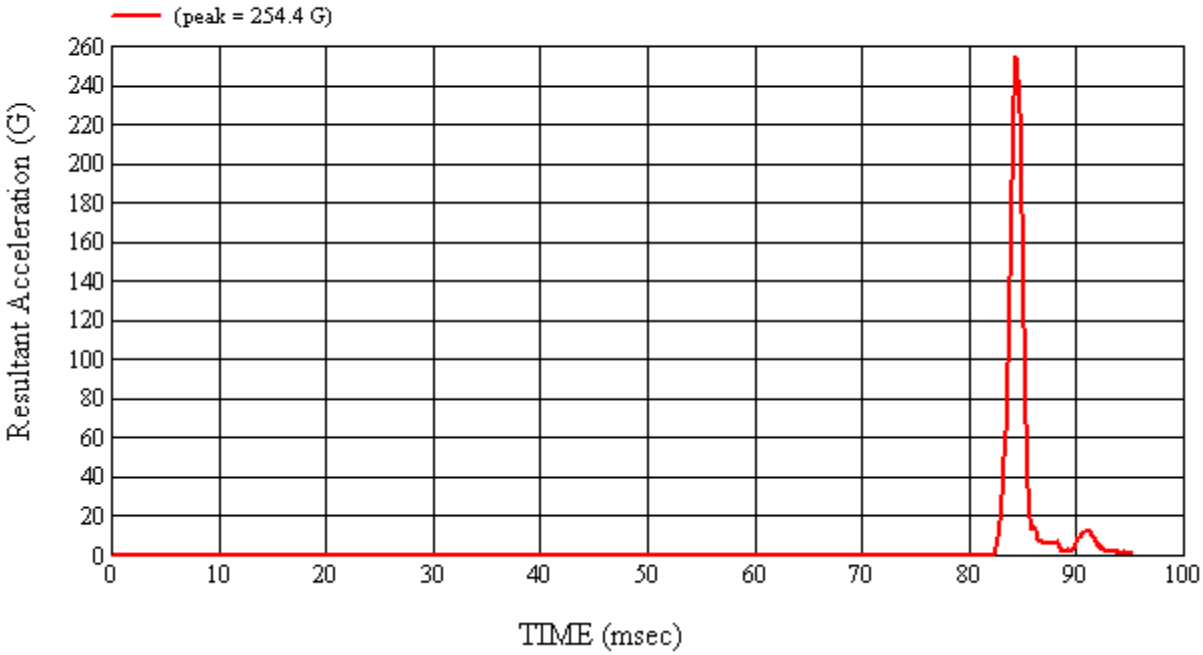
HEADFORM SERIAL NUMBER: 037	CALIBRATION DATE: 7/26/2011 CALIBRATION TIME: 2:47:58 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	22.8
Relative Humidity	10% to 70%	48.5
Peak Resultant Acceleration	225 G's to 275 G's	254.4
Peak Lateral Acceleration	15 G's Maximum	8.0
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J32177	02/04/11	08/04/11
2	ENDEVCO	7264-2000	J14103	02/04/11	08/04/11
3	ENDEVCO	7264-2000	J35800	02/04/11	08/04/11

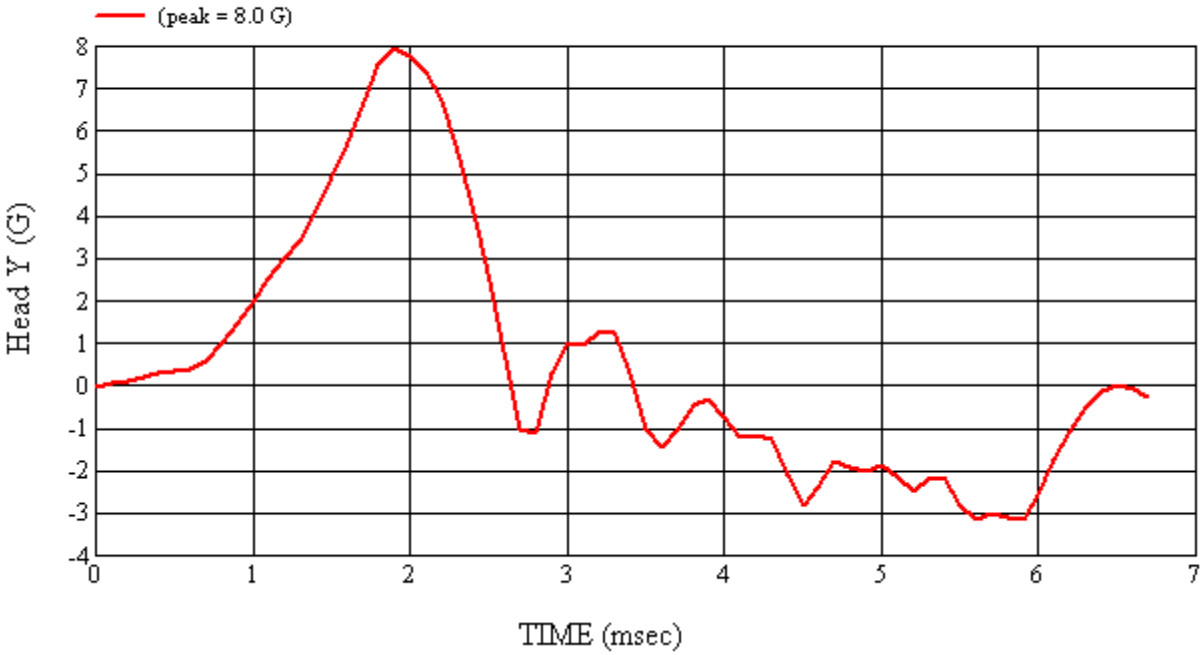
REMARKS:

RECORDED BY: _____ DATE: __7/26/2011____

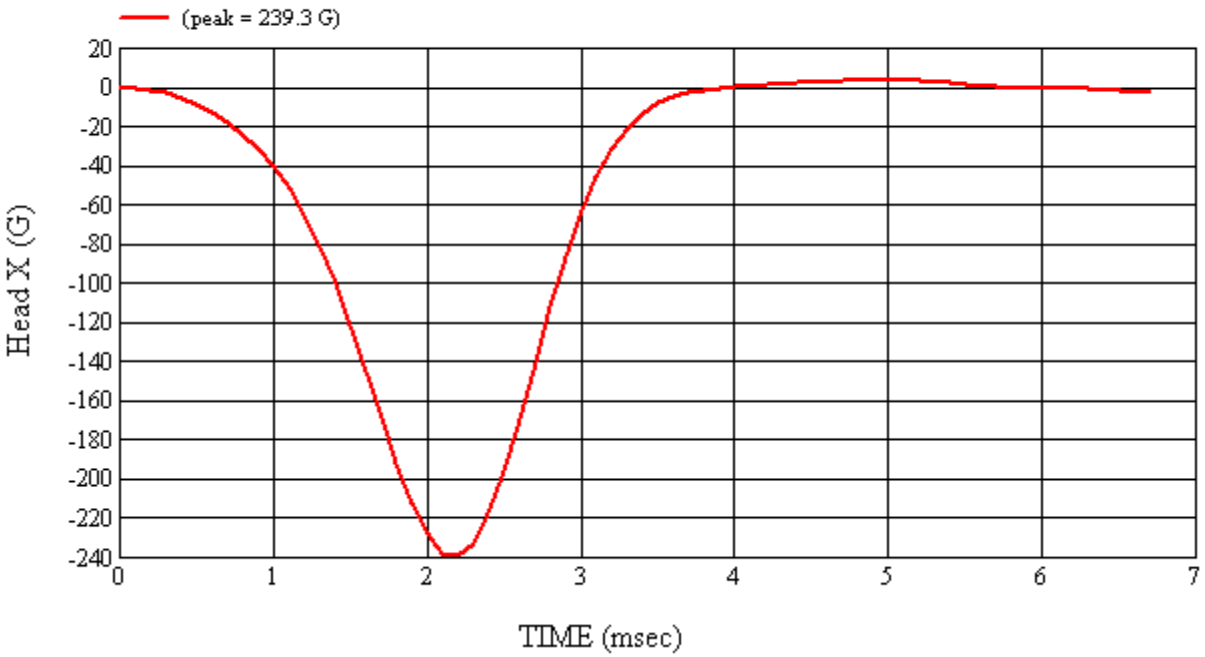
APPROVED BY: _____



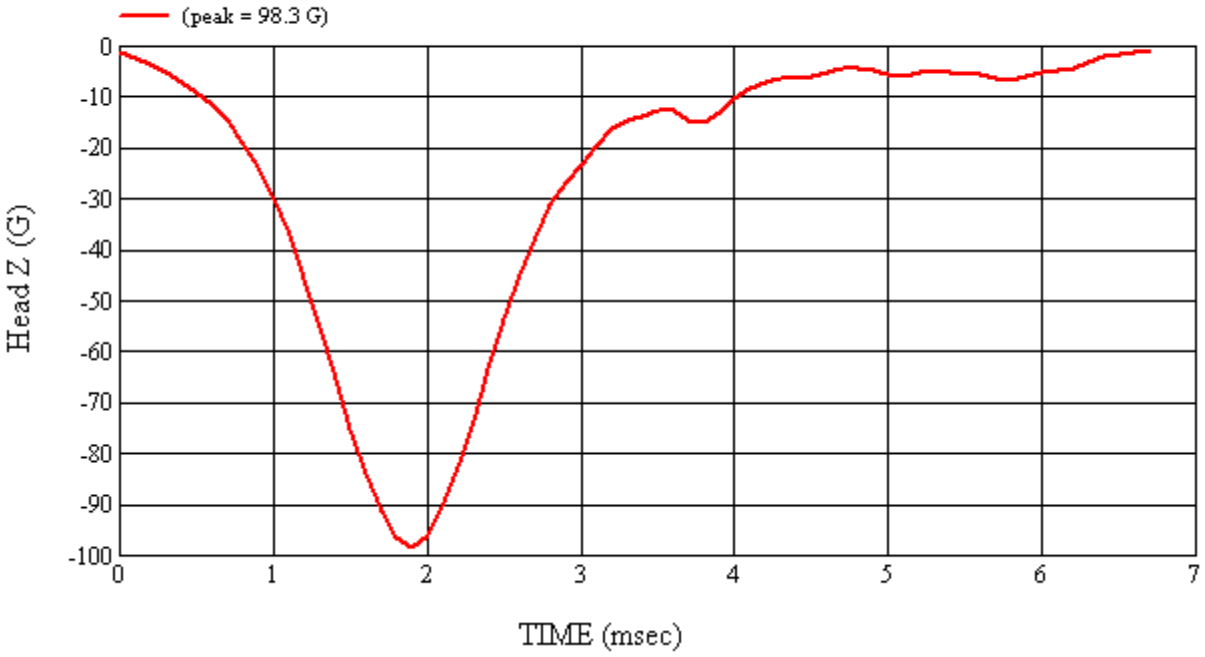
Head 037 (Pre) Calibration #H37045



Head 037 (Pre) Calibration #H37045



Head 037 (Pre) Calibration #H37045



Head 037 (Pre) Calibration #H37045

4-4 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

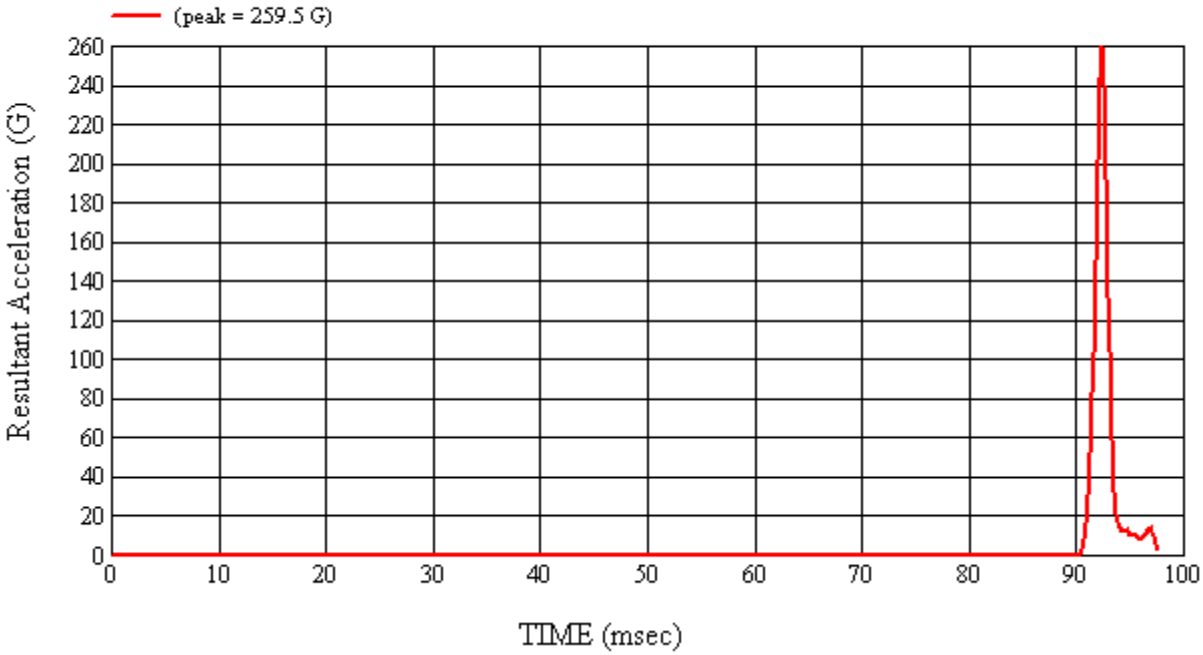
HEADFORM SERIAL NUMBER: 037	CALIBRATION DATE: 8/1/2011 CALIBRATION TIME: 1:22:33 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	23.3
Relative Humidity	10% to 70%	57.9
Peak Resultant Acceleration	225 G's to 275 G's	259.5
Peak Lateral Acceleration	15 G's Maximum	7.3
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J32177	02/04/11	08/04/11
2	ENDEVCO	7264-2000	J14103	02/04/11	08/04/11
3	ENDEVCO	7264-2000	J35800	02/04/11	08/04/11

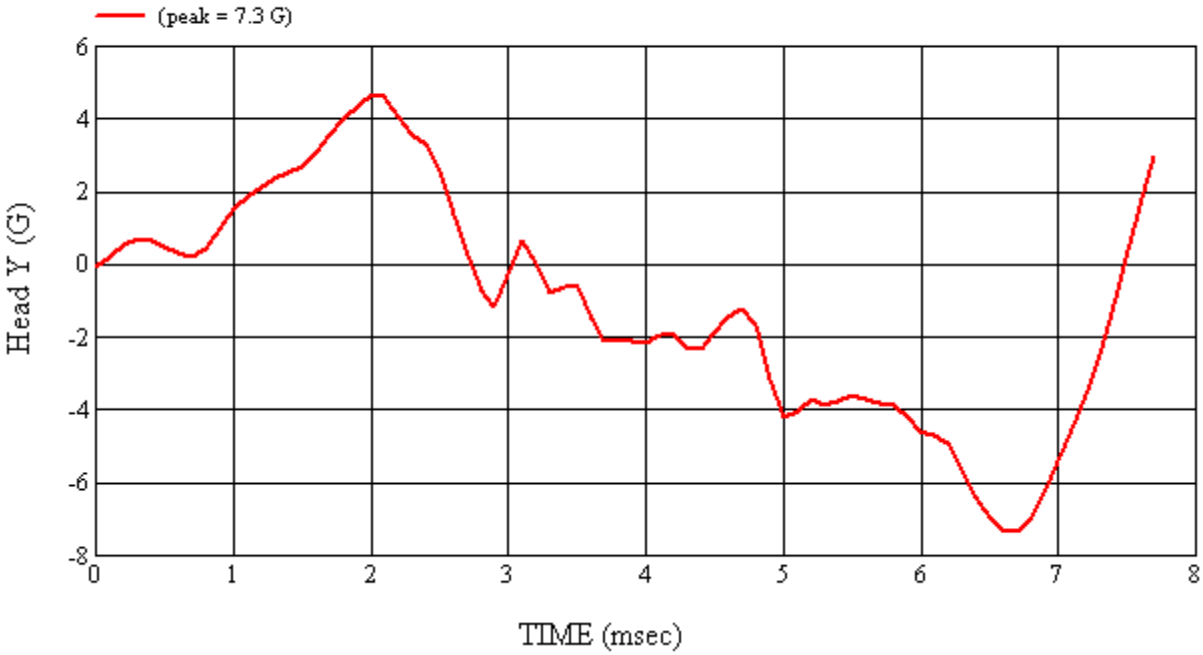
REMARKS:

RECORDED BY: _____ DATE: 8/1/2011

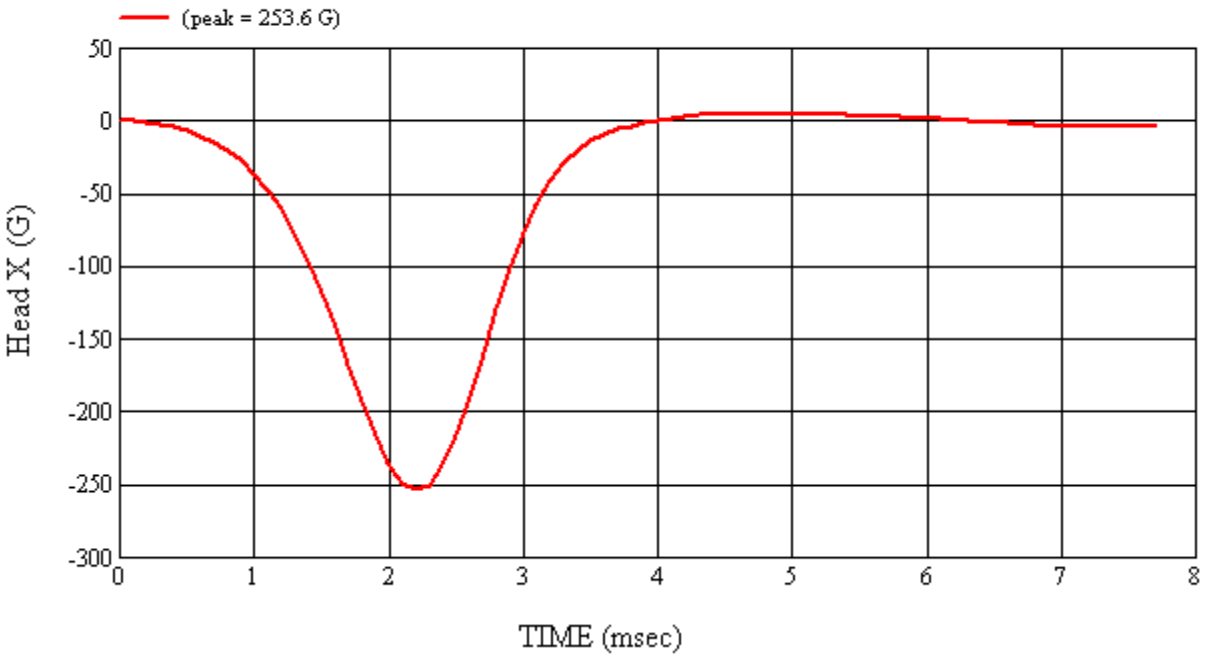
APPROVED BY: _____



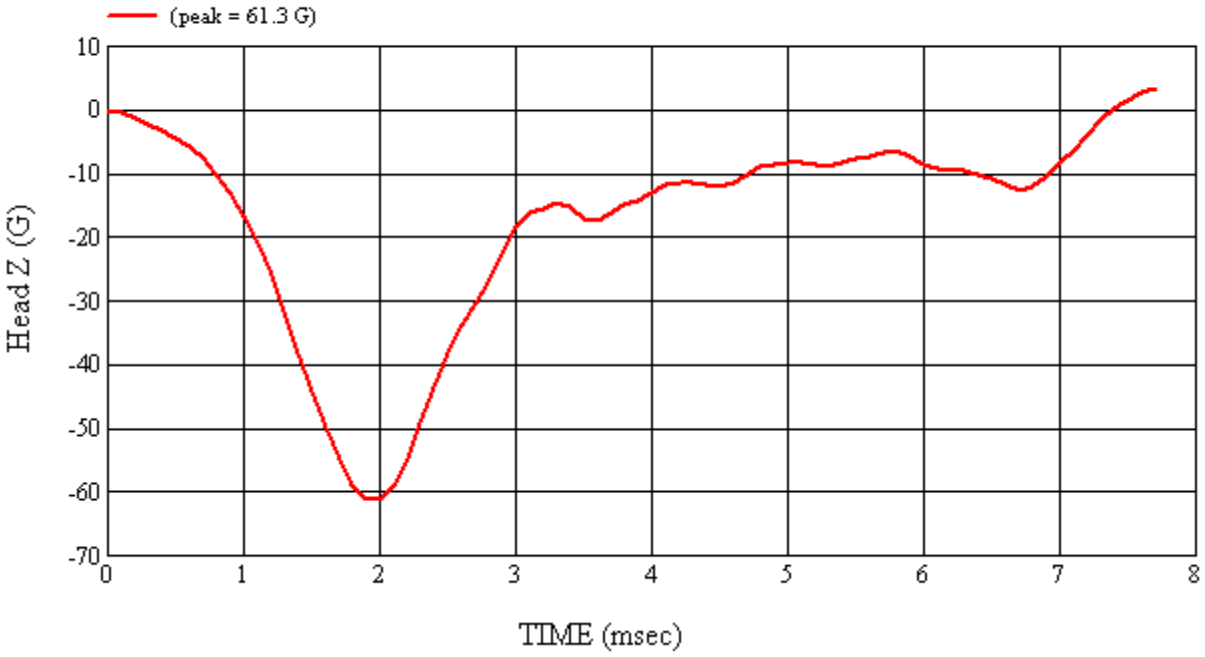
Head 037 (Post) Calibration #H37046



Head 037 (Post) Calibration #H37046



Head 037 (Post) Calibration #H37046



Head 037 (Post) Calibration #H37046

4-5 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: 038	CALIBRATION DATE: 7/26/2011 CALIBRATION TIME: 3:04:08 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	22.9
Relative Humidity	10% to 70%	48.0
Peak Resultant Acceleration	225 G's to 275 G's	257.7
Peak Lateral Acceleration	15 G's Maximum	12.0
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION

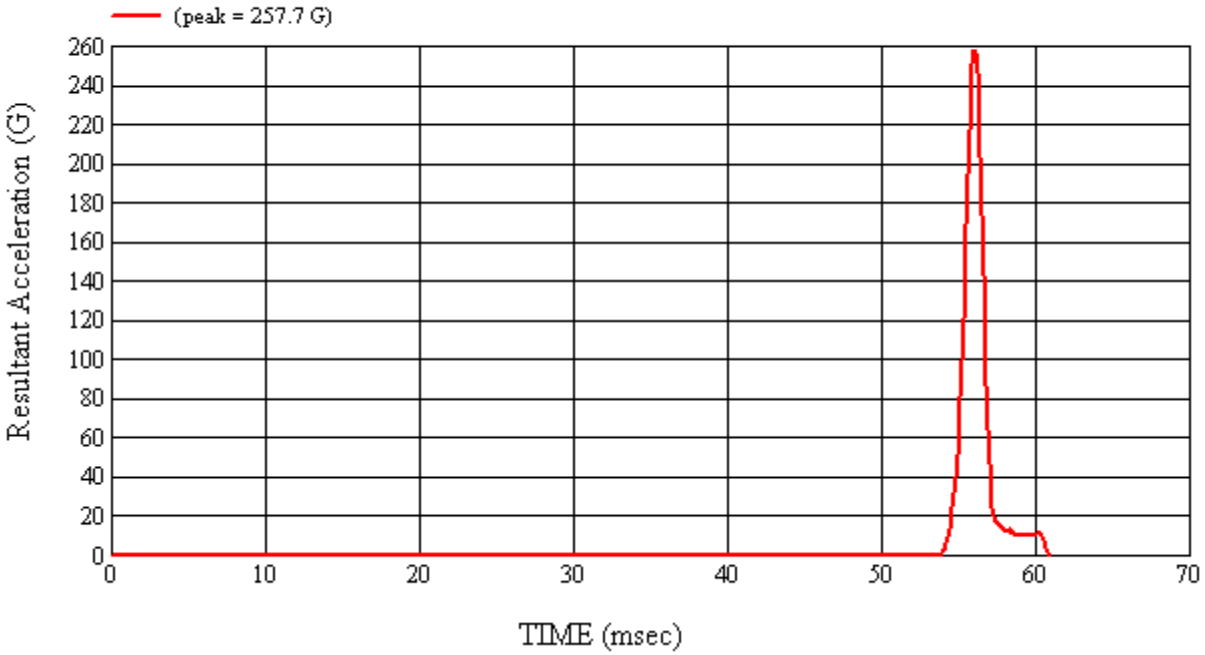
HEAD ACCELEROMETERS

Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	J22700	02/07/11	08/07/11
2	ENDEVCO	7264-2000	J36197	02/07/11	08/07/11
3	ENDEVCO	7264-2000	J36353	02/07/11	08/07/11

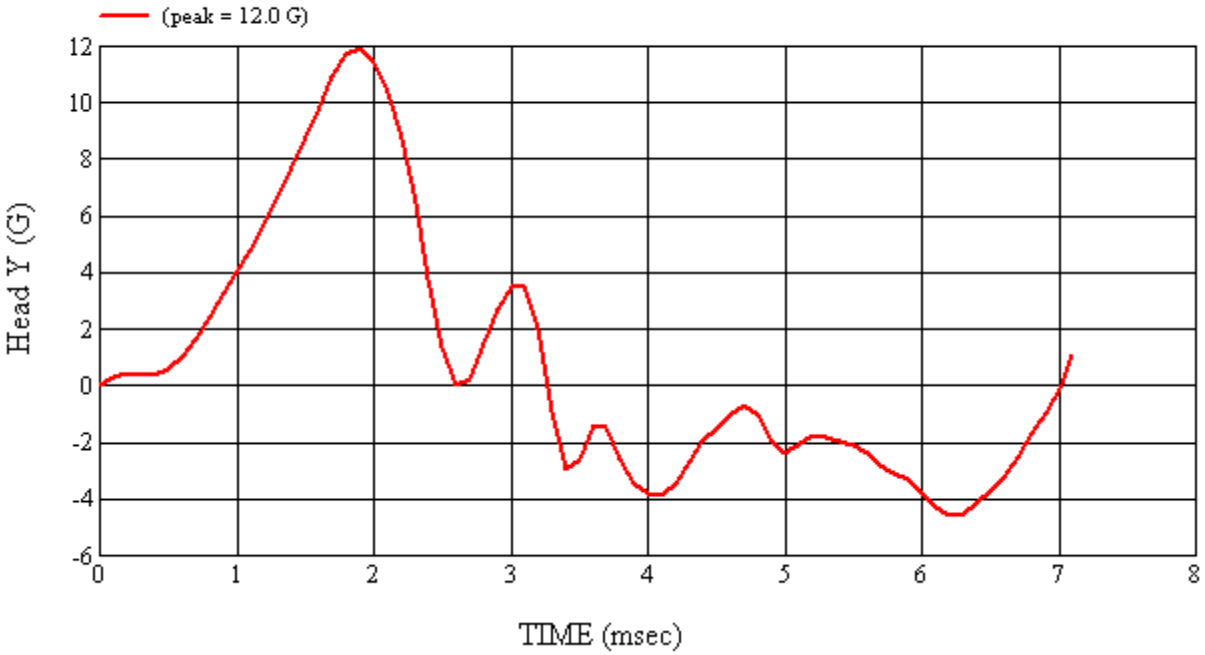
REMARKS:

RECORDED BY: _____ DATE: __7/26/2011____

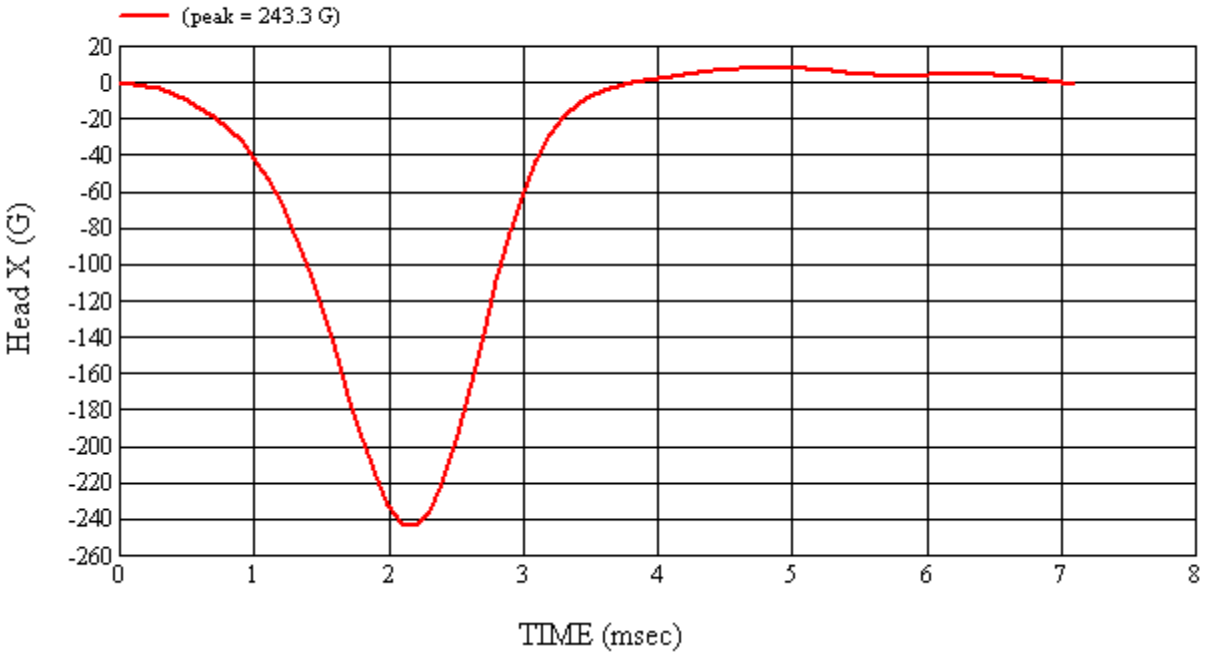
APPROVED BY: _____



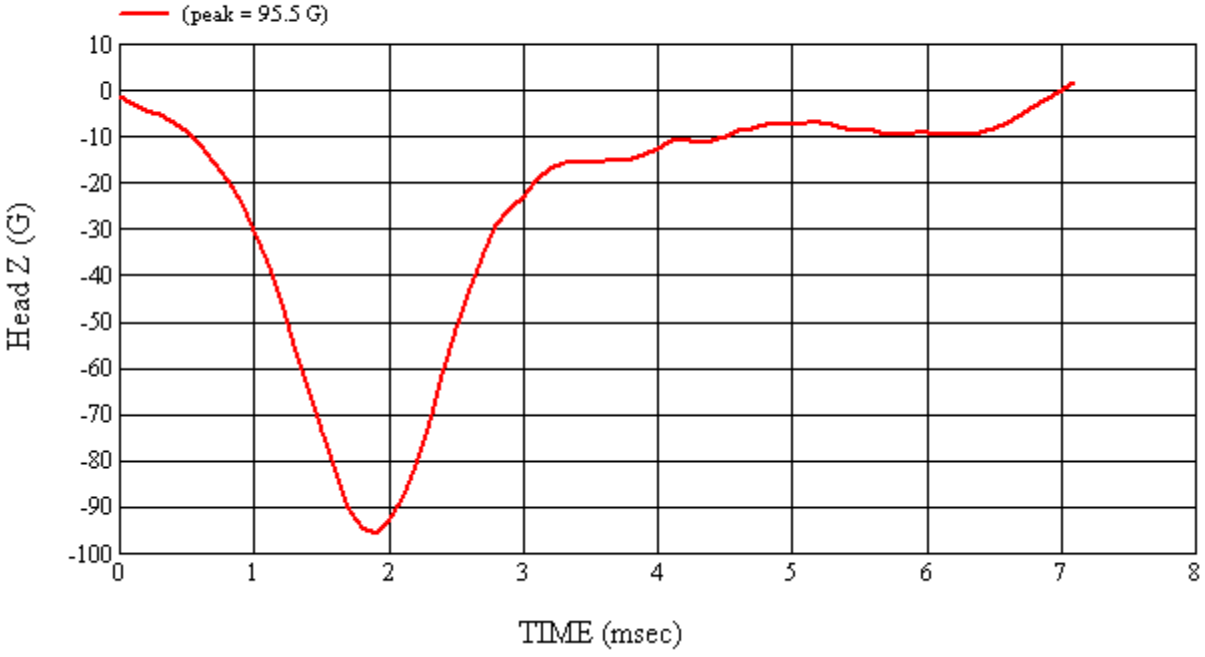
Head 038 (Pre) Calibration #H38045



Head 038 (Pre) Calibration #H38045



Head 038 (Pre) Calibration #H38045



Head 038 (Pre) Calibration #H38045

4-6 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

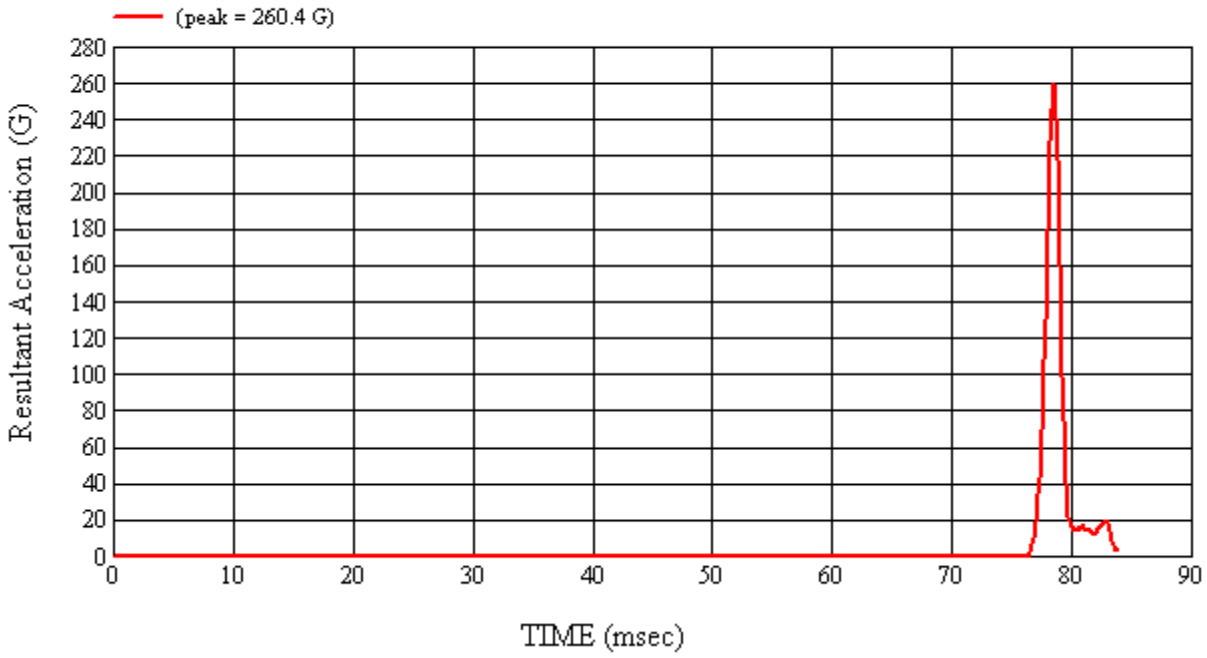
HEADFORM SERIAL NUMBER: 038	CALIBRATION DATE: 8/1/2011 CALIBRATION TIME: 1:37:24 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	23.3
Relative Humidity	10% to 70%	58.7
Peak Resultant Acceleration	225 G's to 275 G's	260.4
Peak Lateral Acceleration	15 G's Maximum	13.7
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	**Manufacturer**	**Model Number**	**Serial Number**	**Date of Last Calibration**	**Date of Next Calibration**
1	ENDEVCO	7264-2000	J22700	02/07/11	08/07/11
2	ENDEVCO	7264-2000	J36197	02/07/11	08/07/11
3	ENDEVCO	7264-2000	J36353	02/07/11	08/07/11

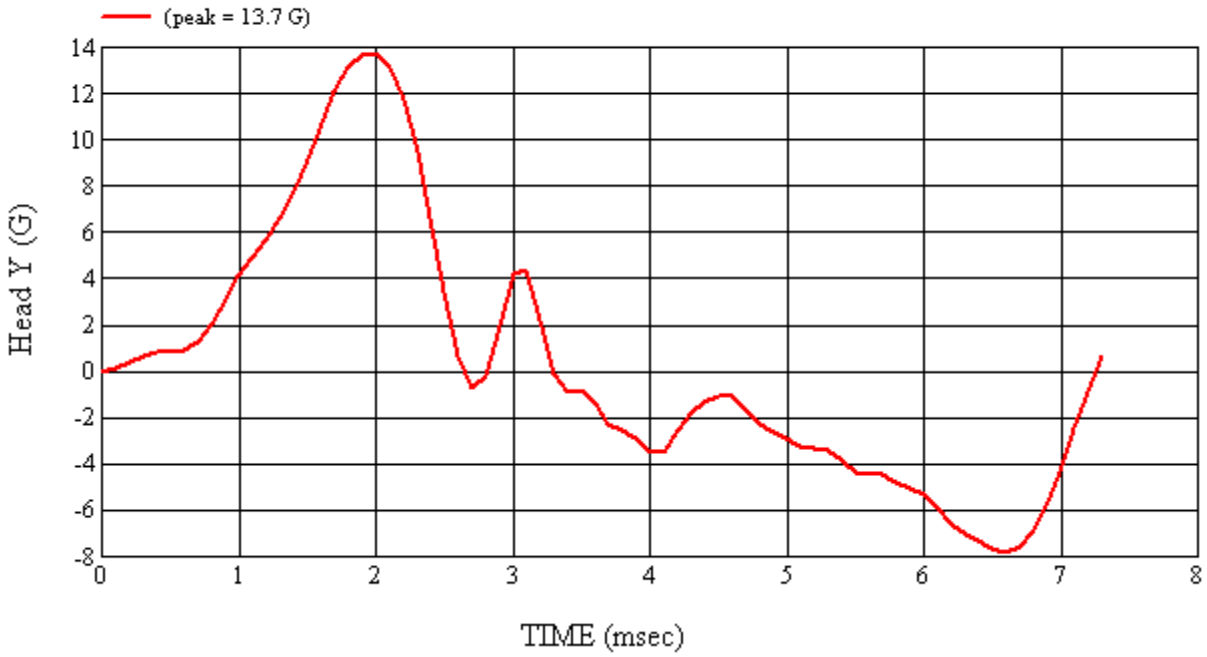
REMARKS:

RECORDED BY: _____ DATE: __8/1/2011____

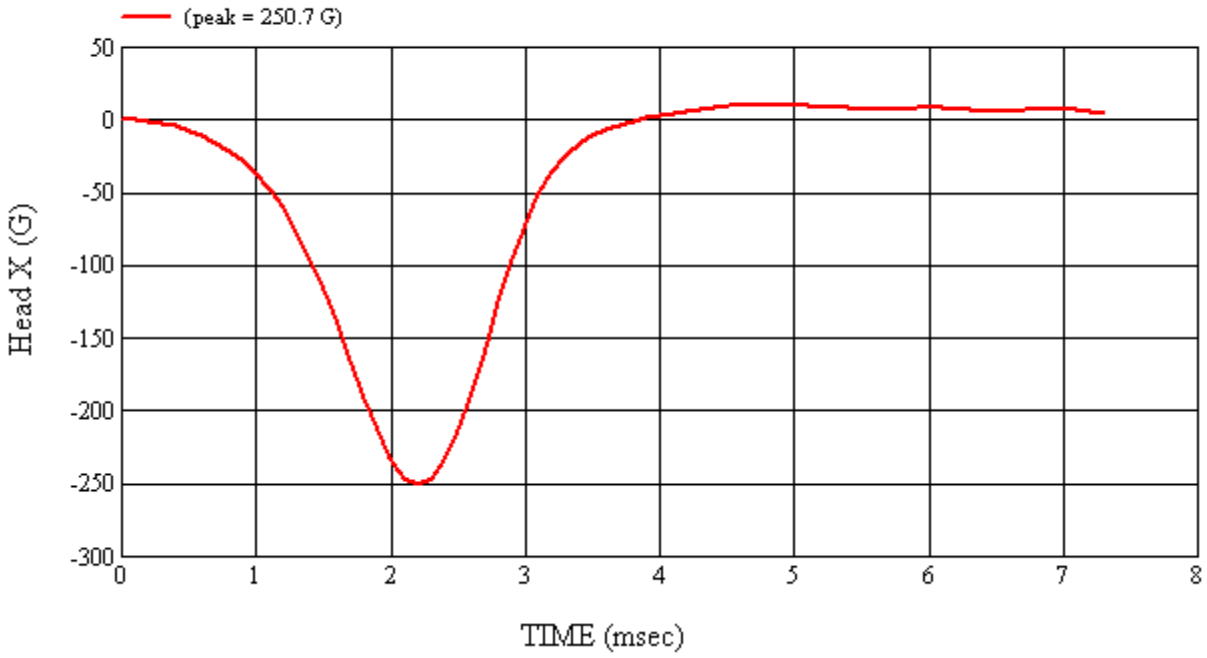
APPROVED BY: _____



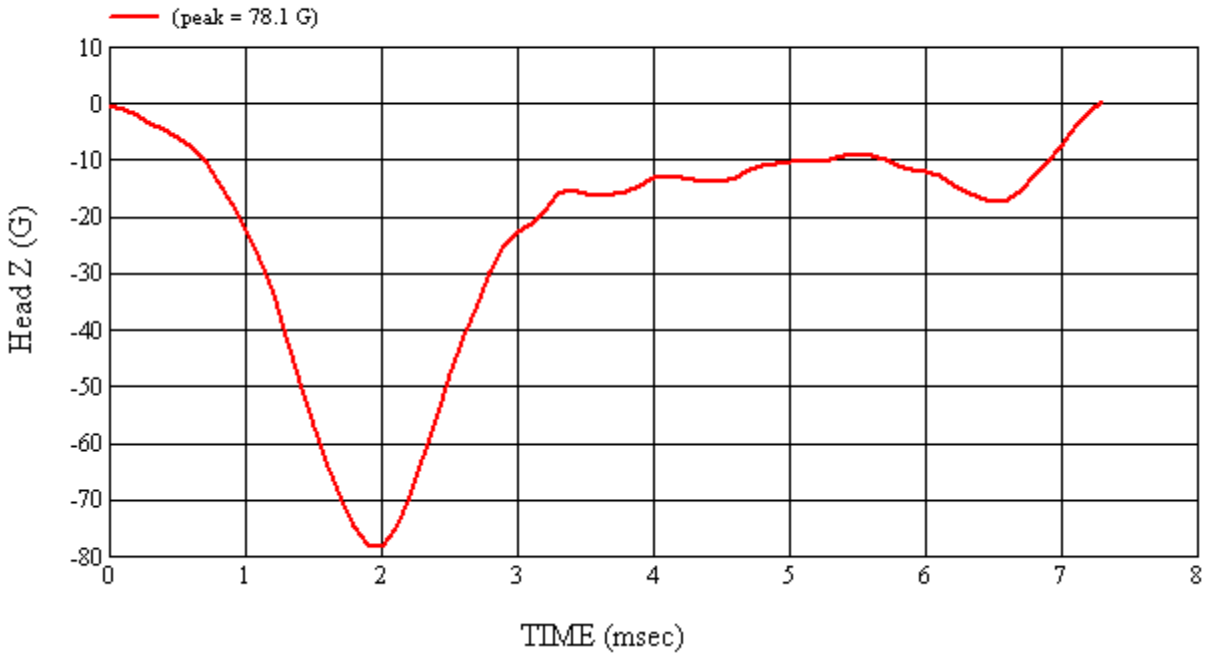
Head 038 (Post) Calibration #H38046



Head 038 (Post) Calibration #H38046



Head 038 (Post) Calibration #H38046



Head 038 (Post) Calibration #H38046

5.0 PHOTOGRAPHS

As Delivered – Left Side View

As Delivered – Right Side View

As Delivered – ¾ Front View From Left Side

As Delivered – ¾ Rear View From Right Side

As Delivered – Vehicle's Certification Label

As Delivered – Vehicle's Tire Information Label

Pre-Test Component Photographs


mga 07/22/11
DOT/NHTSA
2012 Nissan NV1500
FMVSS 201U
DTNH22-09-D-00131
Pre-Test Components
G11I7-001.14


mga 07/22/11
DOT/NHTSA
2012 Nissan NV1500
FMVSS 201U
DTNH22-09-D-00131
Pre-Test Components
G11I7-001.14

Post-Test Component Photographs

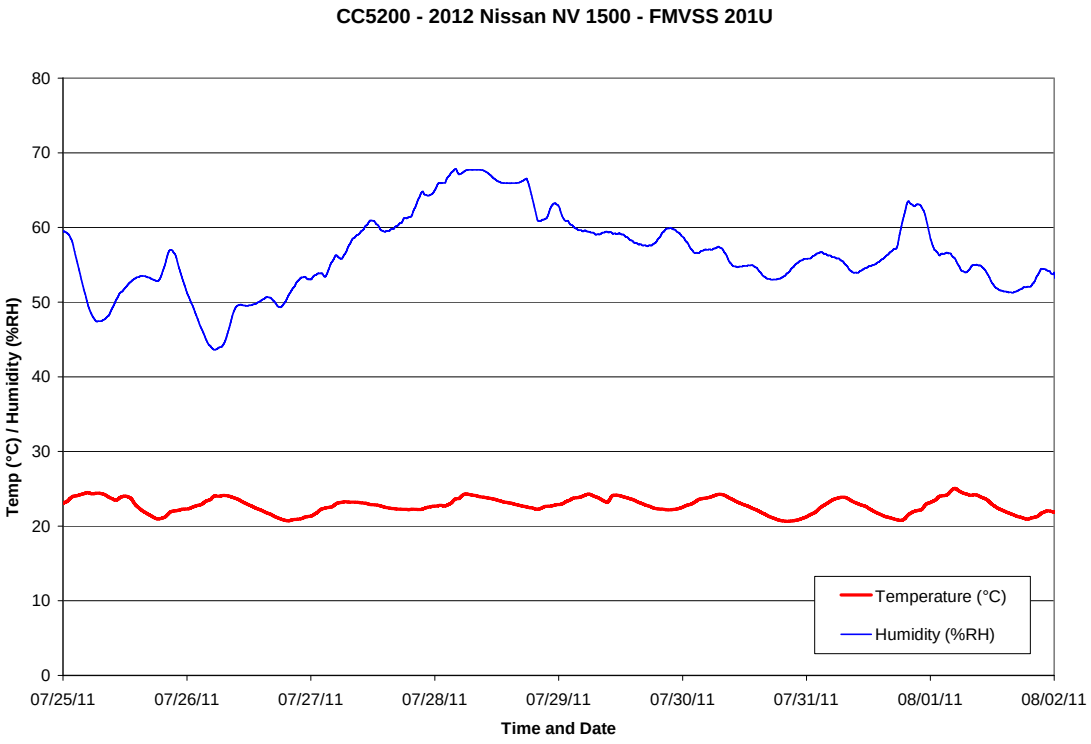

BP1
SR2B
SR2A
mga
08/01/11
DOT/NHTSA
2012 Nissan NV1500
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.14


SR2A
SR2B
BP1
mga
08/01/11
DOT/NHTSA
2012 Nissan NV1500
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.14


UR4
UR2
UR5
08/01/11
DOT/NHTSA
2012 Nissan NV1500
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.14


08/01/11
DOT/NHTSA
2012 Nissan NV1500
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.14

Appendix A – Temperature Trace



Appendix B – Calibration Certificates

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	9/14/2010
Calibrated By:	Modal Shop

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J35919
Capacity/Range: (G's)	2,000

Calibration Date:	2/4/2011
New DLR(Units:G'S) [1] 100K SHUNT	95.8
Linearity:[2]	0.99951
New vs Old Sensitivit (% Difference)	0.7
Temperature:	72 °F
Humidity:	20 %
Sensitivity (mV/V/G):	0.025975
Calibrated By:	Ryan Jones

Signature: _____

Approved by: Edward A. Kalata

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	9/14/2010
Calibrated By:	Modal Shop

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J22664
Capacity/Range: (G's)	2,000

Calibration Date:	2/4/2011
New DLR(Units:G'S) [1] 100K SHUNT	94.2
Linearity:[2]	0.99938
New vs Old Sensitivit (% Difference)	1.2
Temperature:	72 ^{0}F
Humidity:	20 %
Sensitivity (mV/V/G):	0.026447
Calibrated By:	Ryan Jones

Signature: _____

Approved by: Helen A. Kalata

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	9/14/2010
Calibrated By:	Modal Shop

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J35924
Capacity/Range: (G's)	2,000

Calibration Date:	2/4/2011
New DLR(Units:G'S) [1] 100K SHUNT	92.8
Linearity:[2]	0.99947
New vs Old Sensitivit (% Difference)	1.2
Temperature:	72 °F
Humidity:	20 %
Sensitivity (mV/V/G):	0.026824
Calibrated By:	Ryan Jones

Signature: _____

Approved by: Steven A. Kaleto

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	9/14/2010
Calibrated By:	Modal Shop

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J32177
Capacity/Range: (G's)	2,000

Calibration Date:	2/4/2011
New DLR(Units:G'S) [1] 100K SHUNT	113.7
Linearity:[2]	0.9997
New vs Old Sensitivit (% Difference)	-0.2
Temperature:	72 °F
Humidity:	20 %
Sensitivity (mV/V/G):	0.021883
Calibrated By:	Ryan Jones

Signature: _____

Approved by: Helen Q. Kaleto

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	9/14/2010
Calibrated By:	Modal Shop

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J14103
Capacity/Range: (G's)	2,000

Calibration Date:	2/4/2011
New DLR(Units:G'S) [1] 100K SHUNT	93.9
Linearity:[2]	0.99955
New vs Old Sensitivit (% Difference)	-0.1
Temperature:	72 °F
Humidity:	20 %
Sensitivity (mV/V/G):	0.026479
Calibrated By:	Ryan Jones

Signature: _____

Approved by: Helen A. Kalata

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	9/14/2010
Calibrated By:	Modal Shop

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J35800
Capacity/Range: (G's)	2,000

Calibration Date:	2/4/2011
New DLR(Units:G'S) [1] 100K SHUNT	97.8
Linearity:[2]	0.9995
New vs Old Sensitivit (% Difference)	0.6
Temperature:	72 °F
Humidity:	20 %
Sensitivity (mV/V/G):	0.025451
Calibrated By:	Ryan Jones

Signature: _____

Approved by: Edward A. Kaleto

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	9/14/2010
Calibrated By:	Modal Shop

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J22700
Capacity/Range: (G's)	2,000

Calibration Date:	2/7/2011
New DLR(Units:G'S) [1] 100K SHUNT	96.4
Linearity:[2]	0.99966
New vs Old Sensitivit (% Difference)	0.5
Temperature:	70 °F
Humidity:	20 %
Sensitivity (mV/V/G):	0.025819
Calibrated By:	Chris Collins

Signature: Chris Collins

Approved by: Steven A. Kaleto

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	9/14/2010
Calibrated By:	Modal Shop

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J36197
Capacity/Range: (G's)	2,000

Calibration Date:	2/7/2011
New DLR(Units:G'S) [1] 100K SHUNT	108.7
Linearity:[2]	0.99976
New vs Old Sensitivit (% Difference)	0.9
Temperature:	70 °F
Humidity:	20 %
Sensitivity (mV/V/G):	0.022869
Calibrated By:	Chris Collins

Signature: Chris Collins

Approved by: Helen A. Kaleto

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference	
Name:	Accel Standard
Model #	352C03
Serial #:	95980
Capacity:	G's:250
Calibration Date:	9/14/2010
Calibrated By:	Modal Shop

Sensor	
Name:	MGA MI
Manufacturer	Endevco
Model #:	7264-2000
Serial #:	J36353
Capacity/Range: (G's)	2,000

Calibration Date:	2/7/2011
New DLR(Units:G'S) [1] 100K SHUNT	99.1
Linearity:[2]	0.99988
New vs Old Sensitivit (% Difference)	0.9
Temperature:	70 °F
Humidity:	20 %
Sensitivity (mV/V/G):	0.025114
Calibrated By:	Chris Collins

Signature: Chris Collins

Approved by: Helen R. Kaleto

1. Actual data of reference and sensor instruments is found in calibration files

2. Linearity is defined as 1- (Standard Deviation/ Mean)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.

THE MODAL SHOP INC
3149 East Kemper Rd.
Cincinnati, OH 45241
Ph: 513-351-9919
Fax: 513-458-2172
www.modalshop.com

~Calibration Certificate~

Sensor Information
Model Number: 352C03
Serial Number: 95980
Manufacturer: PCB
ID Number:
Description: ICP® Accelerometer

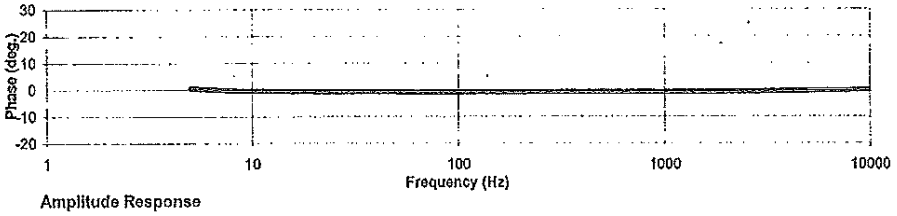
Calibration Data

Sensitivity @ 100 Hz:	9.94	mV/g
Phase @ 100 Hz:	-0.87	deg.
Test Level:	10.00	g

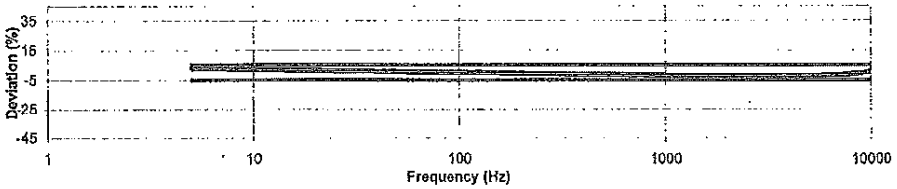
Transducer Specifications

Amp. Range:	± 500	g
Resolution:	0.0005	g
Resonant Freq:	≥ 50000	Hz
Temp. Range:	-54 to 121	°C
	-65 to 250	°F
Axis:	Uni-Axial	

Phase Response



Amplitude Response



Data Table

Freq. (Hz)	Deviation (%)	Phase (deg)
5	3.15	0.41
10	2.18	-0.36
30	0.99	-0.71
50	0.62	-0.68
100	0.00	-0.87
300	-0.88	-0.81
500	-1.29	-0.77
1000	-1.87	-0.77
2000	-2.45	-0.68
3000	-2.46	-0.61
4000	-2.59	-0.49
5000	-2.40	-0.40
6000	-2.09	-0.26
7000	-1.63	-0.23
8000	-1.10	-0.13
9000	-0.30	0.02
10000	0.76	-0.01

Notes
Results relate only to the items calibrated.
This certificate may not be reproduced except in full, without written permission.
Method: Calibration is performed in compliance with ISO 9001 and ISO 17025
This calibration was performed with TMS 9155C Calibration Workstation version 4.6.1
Calibration traceable to primary method which has been proficiency validated through interlaboratory comparison to NIST (project number 822/271196).
Back-to-Back Comparison Calibration per ISO16063-21 .
Procedure Used: PRD-P220
Measurement uncertainty (95% confidence level with coverage factor 2) for frequency ranges tested during calibration are as follows: 0.5-4.99 Hz; ± 3.00%, 5-9.99 Hz; ± 2.50%, 10-99 Hz; ± 1.70%, 100 Hz; ± 1.25%, 101-920 Hz; ± 1.40%, 921-5000 Hz; ± 1.70%, 5001-10,000 Hz; ± 2.20%, 10,001-15,000 Hz; ± 3.65%, 15,001-20,000 Hz; ± 4.75%.

Customer
MGA Research Corp.

User Notes

Unit Condition
As Found: In Tolerance
As Left: In Tolerance

Lab Conditions
Temperature: 73 (23) °F (°C)
Humidity: 32 %

Approval Information
Technician: Ed Devlin
Approval:

Cal Date: 9/14/2010
Due Date:

ACCREDITED

Cal ID: 15600 264901

THE MODAL SHOP INC
3149 East Kemper Rd.
Cincinnati, OH 45241
Ph: 513-351-9919
Fax: 513-458-2172
www.modalshop.com

~Calibration Certificate~

Sensor Information

Model Number	352C03
Serial Number	95980
Manufacturer	PCB
ID Number	

Note

This certificate may not be reproduced except in full, without written permision.

Standards and/or Equipment Used During Calibration

Description	Manufacturer	Model	Serial	Due Date
Data Aquisition Card	NI	4461	15004324	6/29/2011
Std Accelerometer	PCB	080A200	110553	12/8/2010
Air Bearing Shaker	PCB	396C11	603	n/a
Std Sig Conditioner	PCB	442A102	173	12/8/2010
SUT Signal Conditioner	PCB	443B101	379	9/19/2010
Power Amplifier	TMS	2100E21-C	1002	n/a

Technician: Ed Devlin Cal Date: 9/14/2010

Customer: MGA Research Corp. Due Date:

ACCREDITED

Cal ID: 16800 2849.01

*

Calibration Certificate

Part Description: Gold **Certification Date:** 6/28/2011 (MMDDYYYY) **Serial#:** G10-02-00-01619

Single Point - (Max-Min)/2 Specification: G10-02 .084mm (.0033") **Certificate#:** G0161940722

Volumetric (Max Deviation) Specification: G10-02 +/-.119mm (+/-.0047") **Temperature:** See attached data

Measurement Standards Traceability

Ball Bar Kit	Asset Number: 1041	Calibration Due: 9/28/2011	*SI Traceability: L20110405KG3
Thermometer	Asset Number: 668	Calibration Due: 2/13/2012	*SI Traceability: A2LA-1001187681
Reference Sphere	Asset Number: TQ223	Calibration Due: 10/5/2012	*SI Traceability: NIST 821/276660-08

The artifacts above have been calibrated with a device traceable to the International System of Units (SI) through a National Metrological Institute (NMI) or through an ISO17025 Accredited Laboratory.
Measurement uncertainty is 3.9 + 5.9X micrometers, where X = length in meters.
Uncertainty is expressed at approximately a 95% Level of Confidence using k=2.00.

Calibration Results*

3 Single Point Articulation Tests at <=20%, 20%-80% and >=80% range.	PASSED
1 Effective diameter sphere test.	PASSED
20 Volumetric ball bar tests in 4 quadrants and 2 orientations.	PASSED

*Calibration conforms to procedures developed in accordance with ASME B89.4.22-2004. See attached data for measurement results.

Instrument condition as received:
Within Specifications

Instrument condition outgoing:
Within specifications

Technician: Neil Maclean Date: 6/28/11
Neil Maclean

This certificate shall not be reproduced, except in full, without permission of FARO Technologies, Inc.
The results of this certificate relate only to the items calibrated or tested.

FARO Technologies, Inc.
Michigan Regional Office
PH1:248-669-8620

FAX:248-669-8656
L-A-B Cert Number:L1147.01-1

46998 Magellan Drive
Wixom, MI 48393
USA

6/28/11 HAir

LABORATORY ACCREDITATION BUREAU ACCREDITED

Revised: September 3, 2009
©2009 FARO

Calibration Certificate

Part Description: Silver
Certification Date: 10/19/2010 (MM/DD/YYYY)
Serial#: S08-05-98-01273
Single Point - (Max-Min)/2 Specification: S08-05 .076mm (.0030")
Certificate#: S0127340470
Volumetric (Max Deviation) Specification: S08-05 +/-.108mm (+/-.0042")
Temperature: See attached data

Measurement Standards Traceability

Ball Bar Kit	Asset Number: 1039	Calibration Due: 10/23/2010	*SI Traceability: METAS-L20100204RG1
Thermometer	Asset Number: TQ023	Calibration Due: 11/20/2010	*SI Traceability: A2LA-1001059862
Reference Sphere	Asset Number: 1241	Calibration Due: 11/21/2011	*SI Traceability: NIST-821/276660-08

The artifacts above have been calibrated with a device traceable to the International System of Units (SI) through a National Metrological Institute (NMI) or through an ISO17025 Accredited Laboratory.
Measurement uncertainty is 3.9 + 5.9X micrometers, where X = length in meters.
Uncertainty is expressed at approximately a 95% Level of Confidence using k=2.00.

Calibration Results*

3 Single Point Articulation Tests at <=20%, 20%-80% and >=80% range.	PASSED
1 Effective diameter sphere test.	PASSED
20 Volumetric ball bar tests in 4 quadrants and 2 orientations.	PASSED

*Calibration conforms to procedures developed in accordance with ASME B89.4.22-2004. See attached data for measurement results.

Instrument condition as received:
Not Within Specification

Instrument condition outgoing:
Within specifications

Technician: [signature] Anthony Parker   Date: 10/19/10

This certificate shall not be reproduced, except in full, without permission of FARO Technologies, Inc.
The results of this certificate relate only to the items calibrated or tested.

FARO Technologies, Inc:
PH1:1-800-736-2771
PH2:407-333-9911
FAX:407-333-8056
L-A-B Cert Number:L1147-1

125 Technology Park
Lake Mary, FL 32746
USA

BMC 11/1/10

FARO®

Page 1 of 6

LABORATORY ACCREDITATION BUREAU
ISO/IEC 17025 Accredited

Revised: September 3, 2009
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f:\control\records\05manufa\partspec\XH08-0495.eps Rev1 RevDate: 12/08/04

MICHIGAN OPERATIONS
DATE: 2/7/04
SUPERCEDES: MGATPTMC.5

DOC. NO.: MGATP_TMC
REVISION NO.: 6
PAGE 3 OF 3

Tape Measure Calibration Certificate

Reference Steel Rule
Brand: SWANSON
S/N: MGA 00798
Calibration Date: 1/25/11

Subject Tape Measure
Brand: STANLEY
S/N: TPM 121
Calibration Date: 3/18/11

Reference in (mm)	Subject Tape Measure	Difference	Reference in (mm)	Subject Tape Measure	Difference
0 (0)	0		18 (450)	18	
1 (25)	1		19 (475)	19	
2 (50)	2		20 (500)	20	
3 (75)	3		21 (525)	21	
4 (100)	4		22 (550)	22	
5 (125)	5		23 (575)	23	
6 (150)	6		24 (600)	24	
7 (175)	7		25 (625)	25	
8 (200)	8		26 (650)	26	
9 (225)	9		27 (675)	27	
10 (250)	10		28 (700)	28	
11 (275)	11		29 (725)	29	
12 (300)	12		30 (750)	30	
13 (325)	13		31 (775)	31	
14 (350)	14		32 (800)	32	
15 (375)	15		33 (825)	33	
16 (400)	16		34 (850)	34	
17 (425)	17		35 (875)	35	

If all differences are ± 1/32 of an inch (1 mm), then the tape measure is acceptable.
Pass X Fail ___ Maximum Difference = 0

Date: 3/18/11 Performed By: RJ Mull

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ± 0.2%. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

gary.hockin@midwayproducts.com

MetroCal Inc.

ACCREDITED
CALIBRATION CERT #0513.01

4700 Barden Court SE, Kentwood MI 49512, Telephone: 616-698-3124, Fax: 616-698-2364, www.metrocal.com

Certificate of Calibration

MGA Research
446 Executive Drive
Troy, MI 48083

Order Number: **69370**
Certificate Number: **100903801**
Page: **1 of 1**

Gauge Number: **MGA00712**
Gauge Desc: **Digital Protractor**
Manufacturer: **Mitutoyo**
Model Number: **950-315**
Serial Number: **06091641**

Customer PO: **N/A**
Last Calibration: **N/A**
Calibration Date: **9/3/10**
Next Calibration: **9/3/11**

As Found Condition: **In Tolerance**

As Left Condition: **In Tolerance**

MetroCal, Inc maintains reference standards of measurement which are traceable to the National Institute of Standards and Technology, or other authorized National Standards. Calibration was performed in accordance with MetroCal Procedure CP045 and complies with the ANSI/NCSL Z540-1 and ISO/IEC 17025 Standards. Results shall not be reproduced, except in full, without the written approval of MetroCal, Inc. Results relate only to the item(s) calibrated. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired. Statements of compliance made using simple acceptance rule.

Standard Used	Cal Date	Due Date	Traceable No.	Calibration Procedure Uncertainty Expressed at 95% confidence (K=2)
Gage Block Set	8/2/10	8/2/11	ID# 105	0.0015°
DoAll Sine Bar	1/21/10	1/21/11	ID# 1879	0.0015°

Results:

As Found Readings

Units	Nominal	Actual	Deviation
Decimal Deg.	5.00	5.0	0.00
	10.00	10.1	0.10
	20.00	20.0	0.00
Tolerance	30.00	30.0	0.00
± 0.1° Level	40.00	39.9	-0.10
± 0.2° Maximum Error			

Reference Level Check: Within ± 0.1 degrees

As Left Readings

Nominal	Actual	Deviation
5.00	5.0	0.00
10.00	10.1	0.10
20.00	20.0	0.00
30.00	30.0	0.00
40.00	39.9	-0.10

Reference Level Check: Within ± 0.1 degrees

Comments: Environmental conditions during calibration: 68 °F, 44% RH.
No adjustment required.

Shannon Kubicek
Calibration Technician

Issued: 9/3/10

☐ Checked box indicate this calibration was performed at the customers facility.

@ 9/8/10

NovaStar SOLUTIONS

Calibration Certificate

ACCREDITED
CALIBRATION # 1277.01

Metrology Management Services
Remit to address:
35200 Plymouth Rd.
Livonia, MI 48150

Calibration Certificate #:
Z52549:1300715528

DICKSON TM325 TEMP/HUMD DISP

SERIAL NUMBER:	N/A	WORK ORDER:	1300715528
ASSET NUMBER:	Z52549		
CUST. ASSET NUM:	MGA00894		
PROCEDURE NAME:	1012		
PROCEDURE REV:	A	TEST RESULT:	PASS
CALIBRATED BY:	JOE McCONNAUGHHAY	PERFORMED ON:	3/21/2011
CUSTOMER:	MGA RESEARCH	CAL DUE DATE:	3/21/2012
	446 Executive Drive	DATA TYPE:	FOUND-LEFT
	Troy, MI 48083	TEMPERATURE:	21.00 °C
PRIMARY CONTACT:	BOB MILLER	HUMIDITY:	38 %

This instrument has been processed and calibrated in accordance with the NovaStar Solutions Quality System Manual and is traceable to the National Institute of Standards and Technology (NIST), or to NIST accepted intrinsic standards of measurement, or derived by the ratio type of self-calibration techniques. The NovaStar Solutions quality system is accredited to ISO/IEC 17025:2005 and ANSI/NCSL Z540-1-1994.

The results reported herein apply only to the calibration of the item described above. No sampling plan was used for this calibration.

The ratio of the tolerance of the instrument or parameter being calibrated to the expanded uncertainty of the standard (TUR) is greater than 4:1 unless otherwise specified. Expanded uncertainties are expressed at the approximate 95% level of confidence using a K=2.
Due to any number of factors, the recommended due date on the item does not imply continuing conformance to specifications during the recommended interval. Unless otherwise stated the unit under test meets or exceeds manufacturer specifications.

For range and best measurement capability specifications for the standards used to perform this calibration, see the most recent calibration report maintained by this calibration laboratory (available upon request).

This report may not be reproduced, except in full, without written approval from NovaStar Solutions.

As Received Condition: IN TOLERANCE **As Returned Condition:** IN TOLERANCE

Action Taken: FULL CALIBRATION

REMARKS:

Standards Used

Asset #	Cert#	Description	Cal Date	Due Date
1504	1504:1296548177	HART SCIENTIFIC 1502A THERMOMETER READOUT	2/7/2011	2/7/2012
1541	1541:1300372477	NEWPORT CT485AL HYGROTHERMOGRAPH	3/17/2011	3/17/2012
1717	1717:1297150241	HART SCIENTIFIC 5614 PRT	2/7/2011	2/7/2012
1917	1917:1296319659	VAISALA M170/HMP76 MEASUREMENT INDICATOR/PROBE	1/29/2011	1/29/2012

***** End of Certificate *****

@ 3/28/11

QA approved: Steve Hall **Date:** 3-22-11
Signature:

Asset Barcode:

MetroCal Inc.

ACCREDITED
CALIBRATION CERT #0513.01

4700 Barden Court SE, Kentwood MI 49512, Telephone: 616-698-3124, Fax: 616-698-2364, www.metrocal.com

Certificate of Calibration

MGA Research
446 Executive Drive
Troy, MI 48083

Order Number: 69370
Certificate Number: 100826804
Page: 1 of 1

Gauge Number: MGA00783
Gauge Desc: 0 to 20lb x 0.01lb Digital Scale
Manufacturer: Detecto
Model Number: AP-20
Serial Number: E10807-0187

Customer PO: N/A
Last Calibration: 8/14/09
Calibration Date: 8/26/10
Next Calibration: 8/26/11

As Found Condition: See Results

As Left Condition: See Results

MetroCal Inc. maintains reference standards of measurement which are traceable to the National Institute of Standards and Technology, or other authorized National Standards. Calibration was performed in accordance with MetroCal Procedure CP042 and relevant sections of the manufacturer's manual. This calibration complies with ISO/IEC 17025 and ANSI/NCSL Z540-1 Standards. Results shall not be reproduced except in full without the written approval of MetroCal Inc. Results relate only to the item(s) calibrated. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired. Statements of compliance made using simple acceptance rule.

Standard Used	Cal. Date	Due Date	Traceable No.	Calibration Procedure Uncertainty Expressed at 95% confidence , (K=2)
Dead Weight Set	3/3/09	3/3/11	ID# 16992	+/-0.001% of Load
Weight Set	9/3/08	9/3/10	ID# 2463	+/-0.001% of Load

Results:
Tolerance used: Class III

Units: lbs — TI Division/Increment: 0.01

	As Found				As Left		
Weight Test	Nominal	Indication	Deviation		Nominal	Indication	Deviation
Zero	0.00	0.00	0.00		0.00	0.00	0.00
0-25% fs	5.00	5.01	0.01		5.00	5.01	0.01
26-50% fs	10.00	10.02	0.02		10.00	10.02	0.02
51-75% fs	15.00	15.02	0.02		15.00	15.02	0.02
76-100% fs	20.00	20.03	0.03		20.00	20.03	0.03
1/2 load test	10.00	10.02	0.02		10.00	10.02	0.02
return to zero	0.00	0.00	0.00		0.00	0.00	0.00
4 quad/Shift Test:	Pass			4 quad/Shift Test:	Pass		

Comments: Environmental conditions during calibration: 75 °F, 39 % RH.
The adapter that was sent in with the scale has loose components, be careful when using.
No adjustments required.

Shannon Kubicek
Calibration Technician

Issued: 8/26/10

☐ Checked box indicate this calibration was performed at the customers facility.

@ 9/8/10

Sterling Scale Co., Inc.
20950 Boening St.
Southfield, MI 48075

Test report for commercial device

F410/12-4
Rev. Date 7/28/08

accredited for calibration 1448.01

Customer: MGA ***Cert#*** 11-8007 ***Temp/Humidity:*** 0k
Location of Calibration: 2839 Elliott Troy, MI 48038
Calibration Date: 7/18/2011 ***Cal Due:*** Jul-12 ***Condition of Item:*** fair
Equipment Make: Intercomp ***Model:*** SW Deluxe ***Serial:*** 26032389 ***Capacity:*** 8800lb x 1lb
NTEP: ***Class:*** ***COC #:***

Applied Test Wt	*Before Adustment*	*Tolerance*	*In-Tolerance Y/N*	*After Adjustment*	*In-Tolerance Y/N*	*Unc*	
1000lb	1000lb	2lb	y	1000lb	y	.5lb	LF
200lb	200lb	1lb	y	200lb	y	.11lb	
1000lb	1000lb	2lb	y	1000lb	y	.5lb	RF
200lb	200lb	1lb	y	200lb	y	.11lb	
1000lb	1000lb	2lb	y	1000lb	y	.5lb	LR
200lb	200lb	1lb	y	200lb	y	.11lb	
1000lb	1000lb	2lb	y	1000lb	y	.5lb	RR
200lb	200lb	1lb	y	200lb	y	.11lb	

shift test
n/a

Platform #1	*Platform #2*	*Platform #3*
☐ Pass	☐ Pass	☐ Pass
☐ Fail	☐ Fail	☐ Fail

Tests performed: ☑ Repeatability ☑ Linearity ☐ Sensitivity ☑ Discrimination

Technician comments: Scale passed all tests performed

Traceable certificate for weights used: A1160,1163,20950,5003,10002

☑ Scale Certified ☐ Scale Rejected

Sterling Scale Service Rep: Dan W. **Date:** **7/18/2011** 1 of 1

The above item has been calibrated using the relevant EPO or OEM procedures utilizing test weights Traceable to International Systems of Units (SI), through the Michigan Department of Agriculture.
Expanded uncertainty(k=2) confidence level of 95% as reported.
Results relate only to items listed.
The reported uncertainty is valid only for the environment in which it is determined.
Any number of factors may cause the item to drift out of calibration before recommended interval has expired for this reason Sterling Scale does not warranty calibration.
This report shall not be reproduced, except in full without approval of the laboratory
Tolerances followed are maintenance/acceptance per HB 44 or customer specific.