FINAL REPORT NUMBER 201UI-MGA-11-17

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

BAYERISCHE MOTOREN WERKE AG
2011 Mini Cooper Countryman
NHTSA No. CB0508

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083

Test Dates: July 14-15, 2011
Report Date: July 20, 2011

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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Accepted By: _____

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16. Abstract A compliance test series was conducted on the subject 2011 Mini Cooper Countryman, NHTSA No. CB0508, 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 14-15, 2011. Test failures identified were as follows: None The data recorded indicates that the 2011 Mini Cooper Countryman 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 2011 Mini Cooper Countryman, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted on July 14-15, 2011 on a 2011 Mini Cooper Countryman, manufactured by Bayerische Motoren Werke AG.

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 2011 Mini Cooper Countryman was equipped with A, B, O, and rear-pillars, a fixed seat belt anchorage on each B-pillar, a grab handle located on the side rail above each door (front and rear), a sunroof, and an overhead console located on the front upper roof.

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:

AP2	OP2	RH	UR3@BP
BP1	FH2	UR1@AP	UR5@SR3-2
BP4	SR2B	UR2@SR2A	UR6@OP1

The 2011 Mini Cooper Countryman 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: 2011 Mini Cooper Countryman

VEH. NHTSA NO.: CB0508 VIN: WMWZB3C54BWH95225 COLOR: True Blue Met.

VEH. BUILD DATE: January, 2011 TEST DATES: July 14-15, 2011

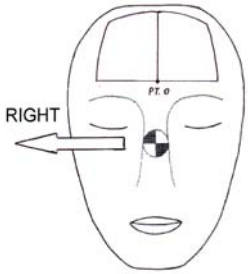
TEST LABORATORY: MGA Research Corporation

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
AP2*	Right	165	38	18.7	473	407	21	9 Left
BP1	Right	90	10	18.7	435	356	58	1 Left
BP4*	Right	145	-2	23.7	541	497	11	0
OP2	Left	270	0	23.6	797	836	10	1 Left
FH2	Right	180	50	23.6	683	685	29	3 Right
SR2B	Left	270	45	18.8	682	683	13	0
RH	Right	0	50	23.6	808	850	6	5 Left
UR1@AP	Left	270	50	23.5	713	724	35	1 Left
UR2@SR2A	Right	90	50	23.6	761	788	32	3 Left
UR3@BP	Left	270	50	23.6	566	529	34	2 Right
UR5@SR3-2	Left	270	50	23.7	662	656	27	6 Left
UR6@OP1	Right	90	50	23.6	802	842	41	12 Right

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.

*The horizontal approach angle chosen for the test was outside of the acceptable range determined using the procedures specified in S8.13.4.1.



POST TEST COMMENTS:

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

AP2 Right: Stress mark on pillar trim.

BP1 Right: Headliner deformation, dislodged headliner.

BP4 Right: Dislodged trim, cracked trim, stress mark on trim.

OP2 Left: Dislodged headliner, stress marks on pillar trim.

FH2 Right: Headliner deformation

SR2B Left: Headliner deformation.

RH Right: Headliner deformation.

UR1@AP Left: Dislodged headliner.

UR2@SR2A Right: Headliner deformation, grab handle compression.

UR3@BP Left: Headliner deformation; dislodged trim.

UR5@SR3-2 Left: Headliner deformation.

UR6@OP1 Right: Headliner deformation, dislodged headliner.

REMARKS:

The targets listed were impacted in the following order:

Left: UR1@AP, SR2B, UR3@BP, UR5@SR3-2, OP2

Right: FH2, UR2@SR2A, AP2, BP1, BP4, UR6@OP1, RH

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 15, 2011

APPROVED BY: Helen A. Kaleto

TABLE 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2011 Mini Cooper Countryman

VEH. NHTSA NO.: CB0508 VIN: WMWZB3C54BWH95225 COLOR: True Blue Met.

VEH. BUILD DATE: January, 2011 TEST DATES: July 14-15, 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, a fixed seat belt anchorage on each B-pillar, a grab handle located on the side rail above each door (front and rear), a sunroof, and an overhead console located on the front upper roof.

SUNROOF INFORMATION:

Installed: _X_ Yes ___ No

Operation: _X_ Electric ____ Manual

SIDE RAIL CURTAIN AIRBAG INFORMATION:

Installed: _X_ Yes ___ No

ROLL-BAR INFORMATION:

Installed: _____ Yes _X_ No

Padded: _____ Yes _X_ No

Braces: _____ Yes _X_ No

GENERAL INFORMATION:

Date Received: May 6, 2011; Odometer Reading 225 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Bayerische Motoren Werke AG

Date of Manufacture: January, 2011; VIN: WMWZB3C54BWH95225

GVWR: 1750 kg; GAWR FRONT: 920 kg;

GAWR REAR: 870 kg;

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 220 kPa REAR: 220 kPa

Recommended Tire Size: 205/55R17

Recommended Cold Tire Pressure:

FRONT: 220 kPa REAR: 220 kPa

Size of Tire on Test Vehicle: 205/55R17

Type of Spare Tire: None; Space Saver:___; Standard__

VEHICLE CAPACITY DATA:

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

Number of Occupants: Front 2; Rear 2; TOTAL 4

VEHICLE CAPACITY WEIGHT:

Vehicle Capacity Weight (VCW) = 390 kg

No. of Occupants x 68 kg = 272 kg

Rated Cargo/Luggage Weight (RCLW) =118 kg (difference)

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

Right Front =	382.0 kg	Right Rear =	302.5 kg
Left Front =	393.5 kg	Left Rear =	278.0 kg
TOTAL FRONT =	775.5 kg	TOTAL REAR =	580.5 kg
% Total Weight =	57.2 %	% Total Weight =	42.8 %

TOTAL DELIVERED WEIGHT = 1356.0 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 1356.0 kg

Max. Test Cargo/Luggage Weight = 118.0 kg

Target Test Weight = 1474.0 kg

WEIGHT OF TEST VEHICLE FULLY LOADED:

Right Front =	380.5 kg	Right Rear =	359.0 kg
Left Front =	387.5 kg	Left Rear =	346.0 kg
TOTAL FRONT =	768.0 kg	TOTAL REAR =	705.0 kg
% Total Weight =	52.1 %	% Total Weight =	47.9 %

TOTAL TEST WEIGHT = 1473.0 kg

Weight of ballast secured in vehicle's cargo area = 117.0 kg

TEST VEHICLE ATTITUDE:

AS DELIVERED: Right Front 724 mm; Left Front 722 mm;
Right Rear 724 mm; Left Rear 726 mm;
Pitch Angle at Right Door Sill = 0.7 Rear is higher
Pitch Angle at Left Door Sill = 0.8 Rear is higher
Roll Angle at Front Bumper = 0.2 Left is higher
Roll Angle at Rear Bumper = 0.1 Left is higher

FULLY LOADED: Right Front 724 mm; Left Front 722 mm;
Right Rear 695 mm; Left Rear 693 mm;
Pitch Angle at Right Door Sill = 0.4 Rear is higher
Pitch Angle at Left Door Sill = 0.1 Rear is higher
Roll Angle at Front Bumper = 0.2 Right is higher
Roll Angle at Rear Bumper = 0.1 Right is higher

AS TARGETED: Right Front 889 mm; Left Front 893 mm;
Right Rear 874 mm; Left Rear 882 mm;
Pitch Angle at Right Door Sill = 0.5 Rear is higher
Pitch Angle at Left Door Sill = 0.4 Rear is higher
Roll Angle at Front Bumper = 0.1 Left is higher
Roll Angle at Rear Bumper = 0.1 Left is higher

AS TESTED ON RIGHT SIDE:

Pitch Angle at Right Door Sill =	0.5 Rear is higher
Pitch Angle at Left Door Sill =	0.5 Rear is higher
Roll Angle at Front Bumper =	0.1 Left is higher
Roll Angle at Rear Bumper =	0.0

AS TESTED ON LEFT SIDE:

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

VEHICLE WHEELBASE = 2600 mm

REMARKS: The seat travel distance was measured to be 220 mm for the driver front seat and 220 mm for the passenger front seat.

RECORDED BY: Nathaniel Newth DATE: July 11, 2011

APPROVED BY: Helen A. Kaleto

TABLE 2-3

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

VEH. MOD YR/MAKE/MODEL/BODY: 2011 Mini Cooper Countryman

VEH. NHTSA NO.: CB0508 VIN: WMWZB3C54BWH95225 COLOR: True Blue Met.

VEH. BUILD DATE: January, 2011 TEST DATES: July 14-15, 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 199.2º	L 246.3º
	R 105º-165º	R 113.9º	R 160.0º
B-PILLAR	L 195º-345º	L 203.4º	L 275.0º
	R 15º-165º	R 88.8º	R 125.2º

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: Nathaniel Newth DATE: July 11, 2011

APPROVED BY: Helen A. Kaleto

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 2011 Mini Cooper Countryman

VEH. NHTSA NO.: CB0508 VIN: WMWZB3C54BWH95225 COLOR: True Blue Met.

VEH. BUILD DATE: January, 2011 TEST DATES: July 14-15, 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 50º
		R 0º-50º	R 0º	R 50º
	FH2	L 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º
SIDE RAIL	SR1	L 0º-50º	L 0º	L 33º
		R 0º-50º	R 0º	R 33º
	SR2A	L 0º-50º	L 0º	L 35º
		R 0º-50º	R 0º	R 35º
	SR2B	L 0º-50º	L 0º	L 45º
		R 0º-50º	R 0º	R 45º
	SR3-1	L 0º-50º	L 0º	L 25º
		R 0º-50º	R 0º	R 25º
	SR3-2	L 0º-50º	L 0º	L 25º
		R 0º-50º	R 0º	R 25º
REAR HEADER	RH	L 0º-50º	L 0º	L 50º
		R 0º-50º	R 0º	R 50º

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
A-PILLAR	AP1	L -5º-50º	L -5º	L 0º
		R -5º-50º	R -5º	R 0º
	AP2	L -5º-50º	L -5º	L 39º
		R -5º-50º	R -5º	R 39º
	AP3	L -5º-50º	L -5º	L 39º
		R -5º-50º	R -5º	R 39º
B-PILLAR	BP1	L -10º-50º	L -10º	L 10º
		R -10º-50º	R -10º	R 10º
	BP2*	L -10º-50º	L -10º	L 6º
		R -10º-50º	R -10º	R 6º
	BP3	L -10º-50º	L -10º	L 1º
		R -10º-50º	R -10º	R 1º
	BP4	L -10º-50º	L -10º	L -2º
		R -10º-50º	R -10º	R -2º
OTHER PILLAR	OP1	L -10º-50º	L -10º	L 14º
		R -10º-50º	R -10º	R 14º
	OP2	L -10º-50º	L -10º	L 0º
		R -10º-50º	R -10º	R 0º
REAR PILLAR	RP1	L -10º-50º	L -10º	L 38º
		R -10º-50º	R -10º	R 38º
	RP2**	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

	VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
UPPER ROOF 6	0º-50º	0º	50º

As determined using the Procedures specified in S8.13.4.2.

*Target BP2 is a seat belt anchorage location treated as a pillar target with respect to horizontal and vertical angle ranges of Table 1, Approach Angle Limits

**Target is located rearward of a vertical plane 600 mm behind the rearmost design seating position and therefore is exempt from testing.

RECORDED BY: Nathaniel Newth DATE: July 11, 2011

APPROVED BY: Helen A. Kaleto

TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2011 Mini Cooper Countryman

VEH. NHTSA NO.: CB0508 VIN: WMWZB3C54BWH95225 COLOR: True Blue Met.

VEH. BUILD DATE: January, 2011 TEST DATES: July 14-15, 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)	220 mm	220 mm
Tº	Horizontal < {CG-F1 (Left Seat) to (Right A-Pillar)}	113.7º	--
A1º	360º - Tº	246.3º	--
Wº	Horizontal < {CG-2 (Left Seat) to (Left A-Pillar)}	199.2º	--
A2º	A2º = Wº	199.2º	--
Uº	Horizontal < {CG-2 (Left Seat) to (Left B-Pillar)}	275.0º	--
B1º	B1º = Uº	275.0º	--
Vº	Horizontal < {CG-R (Left Seat) to (Left B-Pillar)}	203.4º	--
B2º	B2º = Vº	203.4º	--
Wº (right)	Horizontal < {CG-F2 (Right Seat) to (Right A-Pillar)}	--	160.0º
A1º (right)	A1º (right) = Wº (right)	--	160.0º
T º (right)	Horizontal < {CG-F1 (Right Seat) to (Left A-Pillar)}	--	246.1º
A2º (right)	360º-Tº (right)	--	113.9º
V º (right)	Horizontal < {CG-R (Right Seat) to (Right B-Pillar)}	--	125.2º
B1º (right)	B1º (right) = Vº (right)	--	125.2º
U º (right)	Horizontal < {CG-F2 (Right Seat) to (Right B-Pillar)}	--	88.8º
B2º (right)	B2º (right) = Uº (right)	--	88.8º
J	A-Pillar {(Plane 3) – (Plane 5)}	334.1 mm	333.6 mm
J/2	J ÷ 2	167.1 mm	166.8 mm
D1	Upper Roof {(Plane A) – (Plane B)}	2019.0 mm	
D1/2	D1 ÷ 2	1009.5 mm	

Measurement	Description	Left Side	Right Side
D2	Upper Roof {(Plane C) – (Plane D)}	1165.2 mm	
D2/2	D2 ÷ 2	582.6 mm	
.35D1	.35 x D1	706.7 mm	
.35D2	.35 x D2	407.8 mm	
N	B-Pillar {(BPR) – (lowest point on daylight opening forward of B-Pillar)}	403.8 mm	402.8 mm
N/2	B-Pillar {(BP3) – (lowest point on daylight opening forward of B-Pillar)}	201.9 mm	201.4 mm
N/4	B-Pillar {(BP4) – (lowest point on daylight opening forward of B-Pillar)}	101.0 mm	100.7 mm
Q	O-Pillar (Plane 13 – Plane 14)	359.1 mm	360.5 mm
Q/2	Q / 2	179.6 mm	180.3 mm
D	R-Pillar (Point 7 – Point M)	915.0 mm	915.0 mm
3D/7	3*D / 7	392.1 mm	392.1 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	1311.0	-345.0	270.0	1311.0	345.0	270.0
Rear	2070.0	-320.0	238.0	2070.0	320.0	238.0

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	1311.0	-345.0	270.0	1311.0	345.0	270.0
Rear	2070.0	-320.0	238.0	2070.0	320.0	238.0

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
CGF1	1251.0	-345.0	930.0	1251.0	345.0	930.0
CGF2	1471.0	-345.0	930.0	1471.0	345.0	930.0
CGR	2230.0	-320.0	898.0	2230.0	320.0	898.0

REFERENCE FOR VEHICLE COORDINATE SYSTEM (measured in millimeters):

Front driver seat front outboard bolt hole (x, y, z) = 1014.0, -543.0, 49.0

Front passenger seat front outboard bolt hole (x, y, z) = 1014.0, 543.0, 49.0

Lower B-pillar body reference mark (x, y, z) = 1392.0, -685.0, 230.0

REMARKS:

RECORDED BY: Nathaniel Newth DATE: July 11, 2011

APPROVED BY: Helen A. Kaleto

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2011 Mini Cooper Countryman

VEH. NHTSA NO.: CB0508 VIN: WMWZB3C54BWH95225 COLOR: True Blue Met.

VEH. BUILD DATE: January, 2011 TEST DATES: July 14-15, 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	1005.9	-491.5	1058.7	246	0	No	--	No
AP2	924.8	-543.2	971.0	200	39	No	--	No
AP3	830.9	-568.7	892.5	200	39	No	--	No
A-Pillar Right Side								
AP1	1008.9	493.7	1057.9	114	0	No	--	No
AP2	925.1	543.8	970.7	160	39	No	--	Yes
AP3	829.7	570.1	892.0	160	39	No	--	No
B-Pillar Left Side								
BP1	1558.8	-466.8	1103.8	270	10	No	--	No
BP2	1540.3	-565.6	922.6	270	6	No	--	No
BP3	1484.6	-581.4	901.3	271	1	No	--	No
BP4	1584.2	-625.1	800.5	215	-2	No	--	No
B-Pillar Right Side								
BP1	1559.6	469.7	1103.1	90	10	No	--	Yes
BP2	1541.3	567.9	922.4	90	6	No	--	No
BP3	1482.4	584.9	901.6	89	1	No	--	No
BP4	1582.6	625.7	800.5	125	-2	No	--	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**					
Other Pillar Left Side								
OP1	2343.9	-459.9	1099.4	270	14	No	--	No
OP2	2373.3	-570.3	919.3	270	0	No	--	Yes
Other Pillar Right Side								
OP1	2340.8	462.5	1100.9	90	14	No	--	No
OP2	2369.6	572.9	921.3	90	0	No	--	No
Rear Pillar Left Side								
RP1	2581.3	-494.3	1038.9	--	--	Yes	--	--
REL	2557.0	-478.4	1034.5	345	38	--	1	No
RP2*	2760.1	-479.9	889.7	Target exempt from testing per S6.3(b).				No
Rear Pillar Right Side								
RP1	2578.5	496.6	1038.3	--	--	Yes	--	--
REL	2562.1	479.4	1034.0	15	38	--	1	No
RP2*	2760.1	482.3	889.2	Target exempt from testing per S6.3(b).				No
Front Header Left Side								
FH1	870.1	-389.1	1071.6	--	--	Yes	--	--
REL	864.3	-366.7	1069.9	180	50	--	1	No
FH2	817.2	-251.1	1067.8	180	50	No	--	No
Front Header Right Side								
FH1	869.6	389.3	1069.7	--	--	Yes	--	--
REL	862.2	366.5	1068.7	180	50	--	1	No
FH2	816.5	250.3	1068.2	180	50	No	--	Yes
Side Rail Left Side								
SR1	1155.0	-480.5	1075.2	--	--	Yes	--	--
REL	1146.5	-464.6	1085.1	270	33	--	1	No
SR2A	1305.5	-481.5	1082.6	--	--	Yes	--	--
REL	1316.2	-469.8	1090.6	270	35	--	1	No
SR2B	1258.3	-494.0	1100.6	--	--	Yes	--	--
REL	1255.3	-518.5	1052.9	270	45	--	2	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**					
SR3-1	1980.3	-446.8	1091.4	270	25	No	--	No
SR3-2	2094.9	-445.0	1090.7	270	25	No	--	No
Side Rail Right Side								
SR1	1158.5	483.7	1075.4	--	--	Yes	--	--
REL	1147.5	469.2	1084.4	90	33	--	1	No
SR2A	1308.2	485.6	1082.2	--	--	Yes	--	--
REL	1317.7	472.2	1091.1	90	35	--	1	No
SR2B	1260.0	497.1	1101.3	--	--	Yes	--	--
REL	1255.6	516.8	1055.8	90	45	--		No
SR3-1	1979.4	446.1	1092.3	90	25	No	--	No
SR3-2	2094.5	442.3	1089.8	90	25	No	--	No
Rear Header Left Side								
RH	2517.6	-319.3	1079.8	0	50	No	--	No
Rear Header Right Side								
RH	2521.1	319.3	1075.7	0	50	No	--	Yes
Upper Roof Left Side								
UR1@AP	1026.2	-371.1	1108.6	270	50	No	--	Yes
UR3@BP	1561.5	-371.7	1137.9	270	50	No	--	Yes
UR5@SR3-2	2098.6	-333.5	1146.4	270	50	No	--	Yes
Upper Roof Right Side								
UR2@SR2A	1308.8	371.5	1127.2	90	50	No	--	Yes
UR4@SR3-1	1969.8	328.1	1148.1	90	50	No	--	No
UR6@OP1	2316.8	358.7	1139.1	90	50	No	--	Yes

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

*Target is located rearward of a vertical plane 600 mm behind the rearmost design seating position and therefore is exempt from testing.

RECORDED BY: Nathaniel Newth DATE: July 11, 2011

APPROVED BY: Helen A. Kaleto

3.0 TEST DATA (Including Acceleration and Velocity Plots)


mga
7/15/2011
Impact Testing
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT AP2
H/V IMPACT ANGLE= 165 / 38
U11326
POST TEST


mga
7/15/2011
Impact Testing
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT AP2
H/V IMPACT ANGLE= 165 / 38
U11326
POST TEST


mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #8 RIGHT AP2
H/V IMPACT ANGLE= 165 / 38
U11326
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#8

Target (Vehicle Side): AP2Right

Temperature:22.2C

MGA Test Reference No.:U11326

Humidity:60.6%

Approach Horizontal Angles:165º

Time of Test:11:04:25 AM

Approach Vertical Angles:38º

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
473	407	8.2	18.7	21	9 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

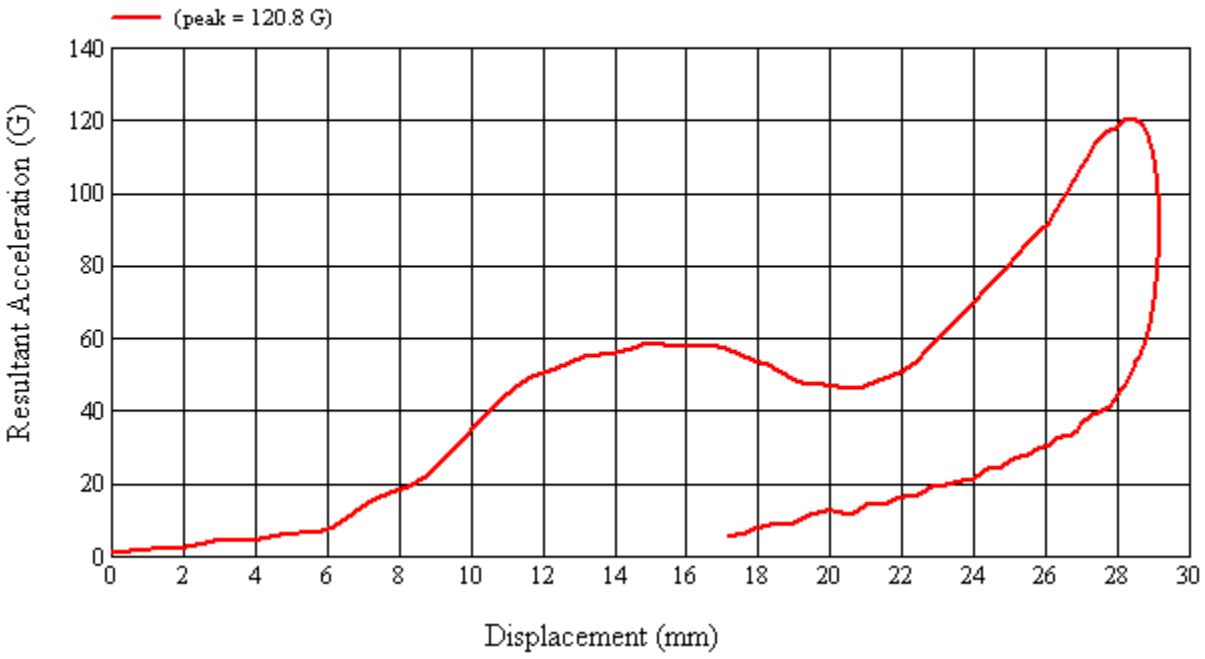
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

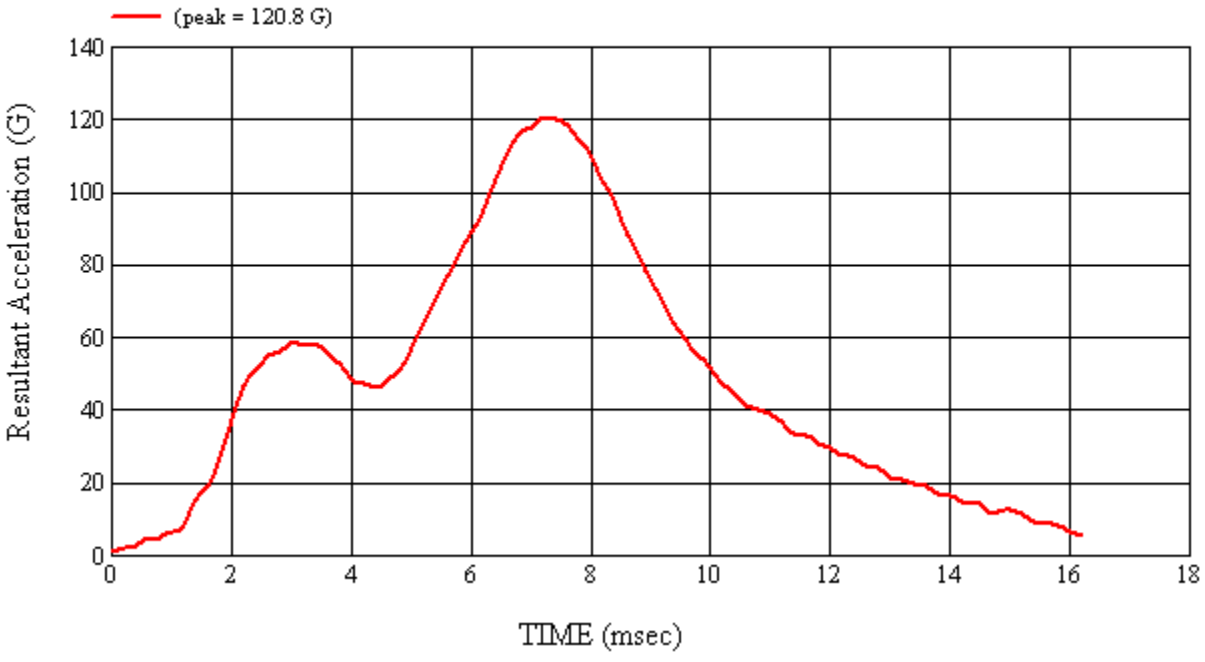
Stress mark on pillar trim

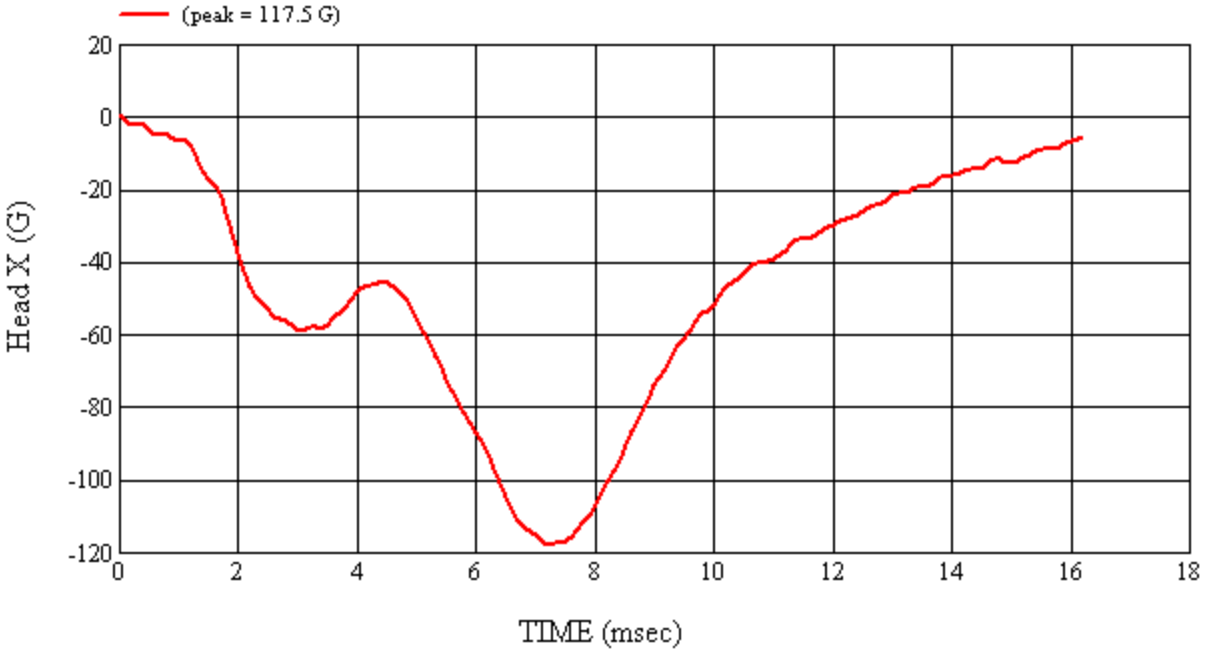
Recorded By: _____ Approved By*: _____ Date: 7/15/2011

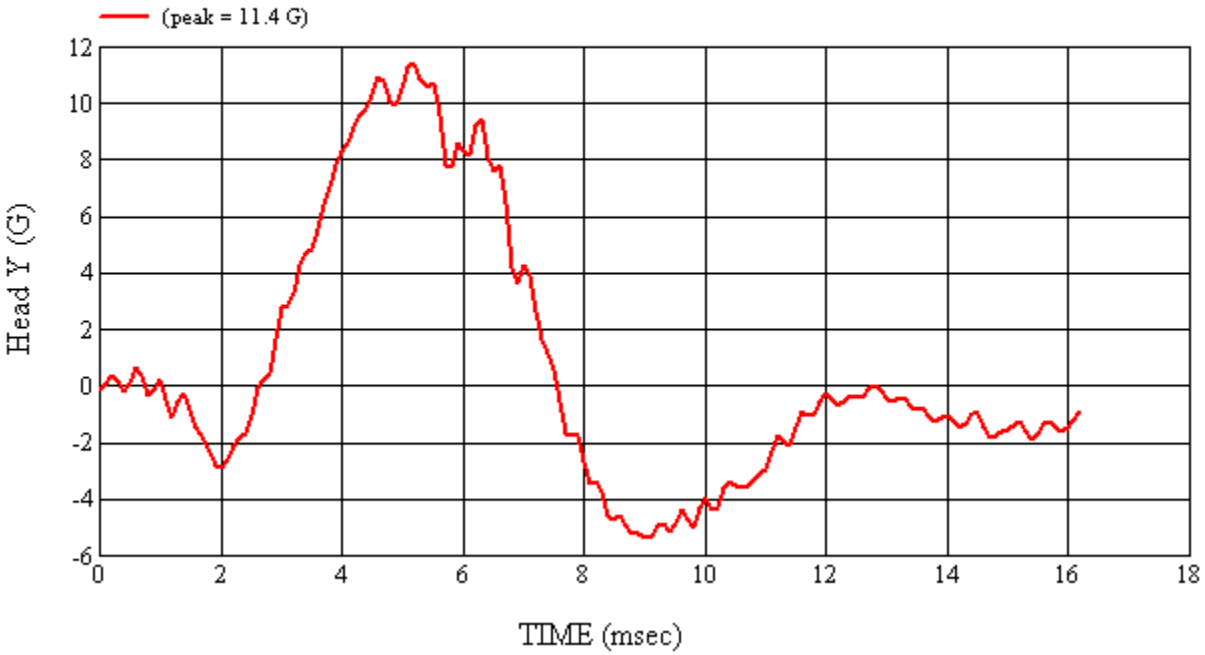
*Only necessary for NHTSA (Government) Compliance testing.

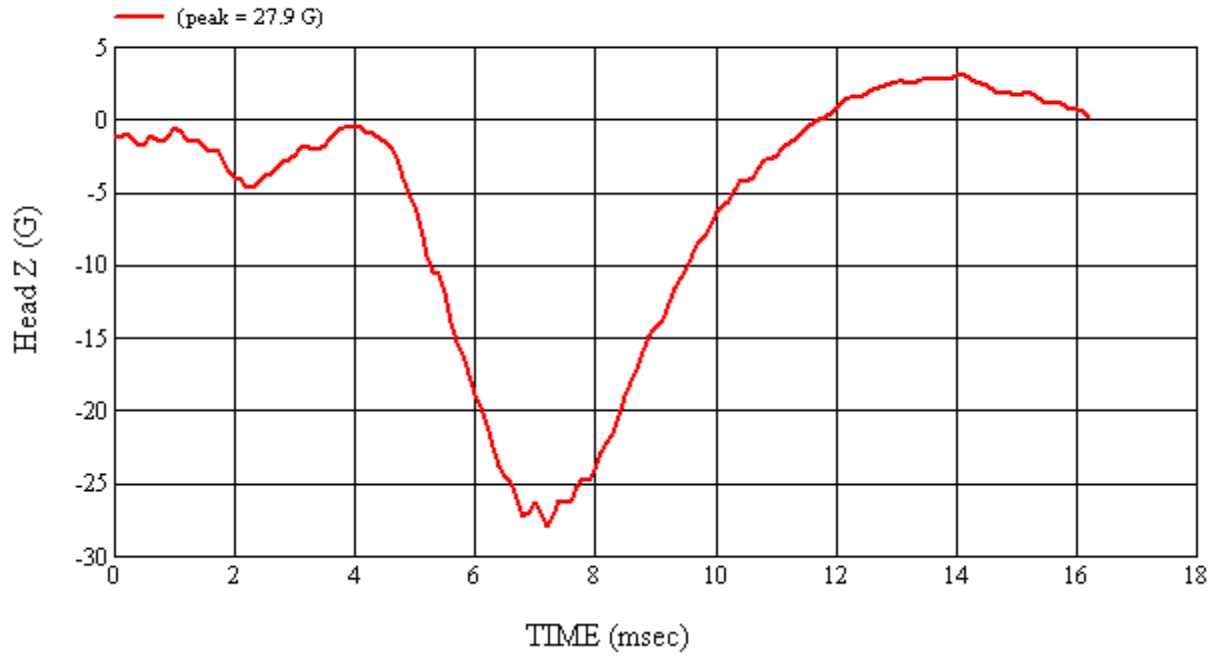
MGA Test #: U11326 Target Location: AP2, Right Side Test Date: 7/15/2011

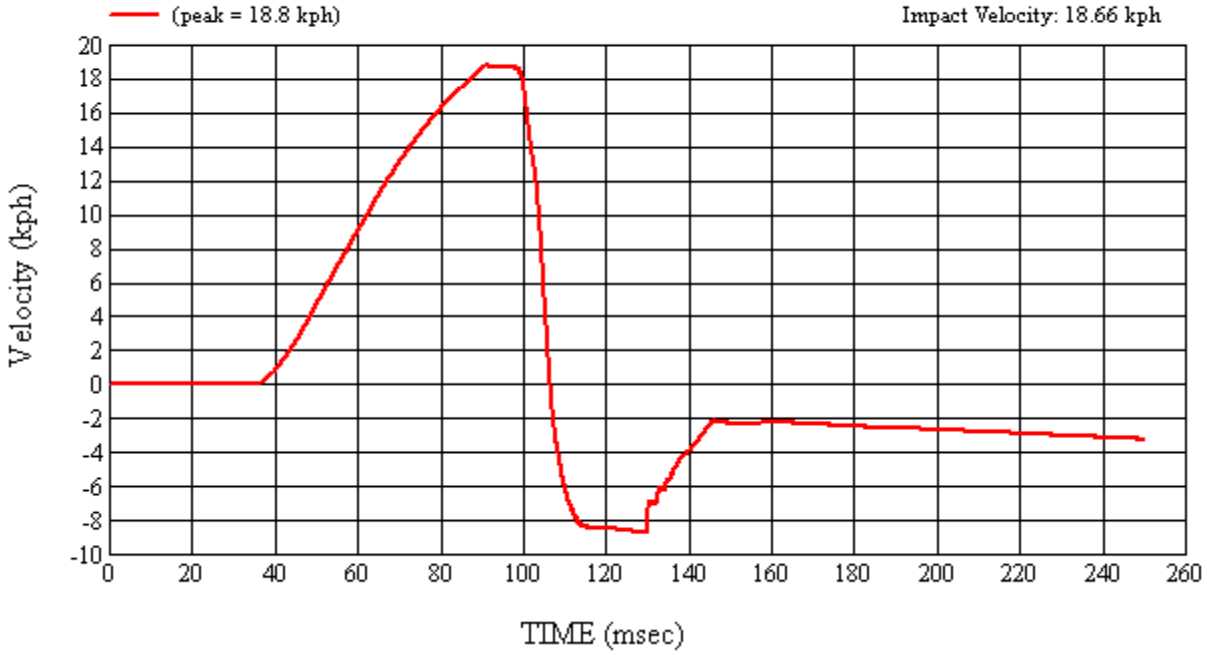


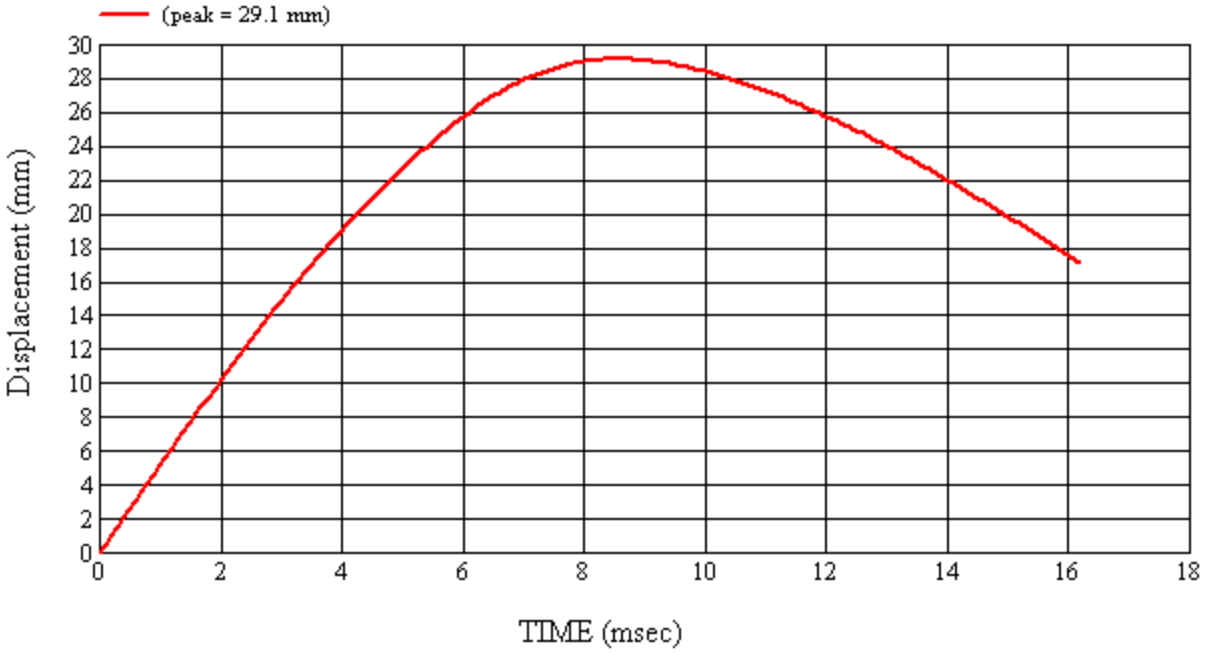



(peak = 117.5 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 11.4 G)
Head Y (G)
12
10
8
6
4
2
0
-2
-4
-6
0
2
4
6
8
10
12
14
16
18
TIME (msec)

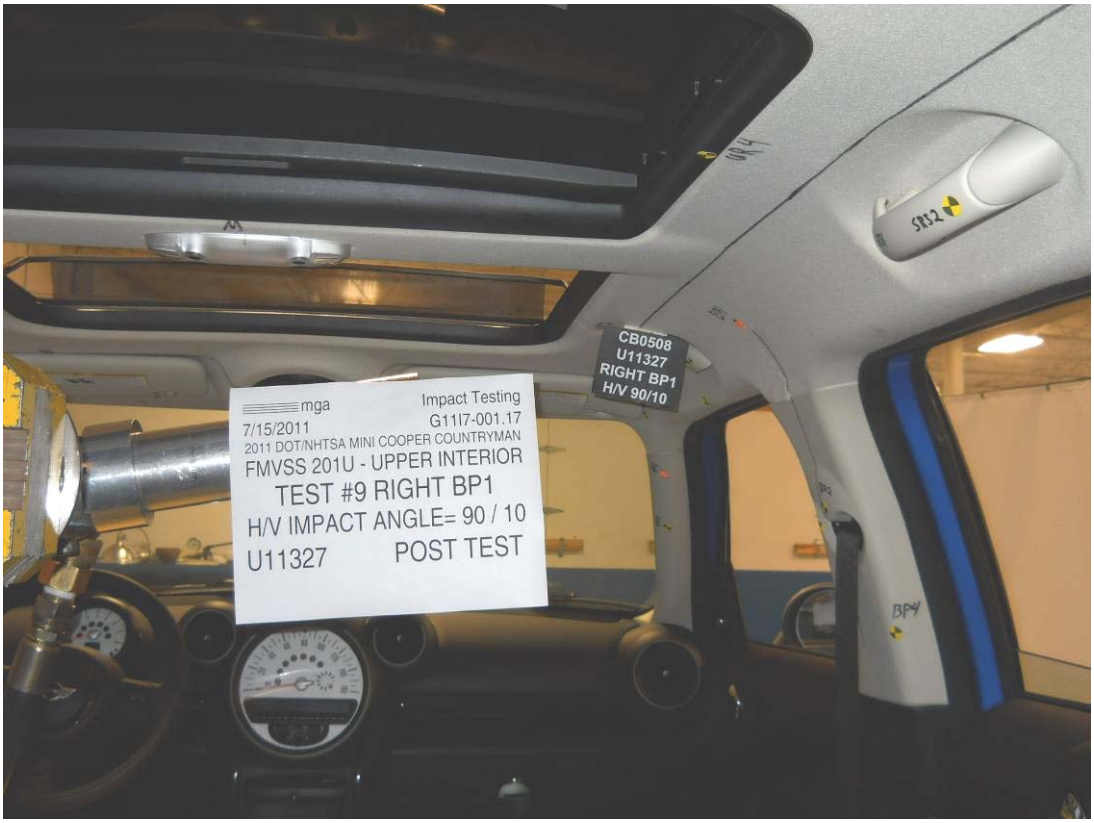

(peak = 27.9 G)
Head Z (G)
5
0
-5
-10
-15
-20
-25
-30
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 18.8 kph)
Impact Velocity: 18.66 kph
Velocity (kph)
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 29.1 mm)
Displacement (mm)
TIME (msec)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30


mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP1
H/V IMPACT ANGLE= 90 / 10
U11327
PRE TEST
BP4


BP1
BP2
mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP1
H/V IMPACT ANGLE= 90 / 10
U11327
PRE TEST


CB0508
U11327
RIGHT BP1
H/V 90/10
mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP1
H/V IMPACT ANGLE= 90 / 10
U11327
POST TEST


CB0508
U11327
RIGHT BP1
H/V 90/10
mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP1
H/V IMPACT ANGLE= 90 / 10
U11327
POST TEST


BP1


mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT BP1
H/V IMPACT ANGLE= 90 / 10
U11327
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#9

Target (Vehicle Side): BP1Right

Temperature:22.4C

MGA Test Reference No.:U11327

Humidity:53.7%

Approach Horizontal Angles:90º

Time of Test:1:08:55 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
435	356	7.4	18.7	58	1 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

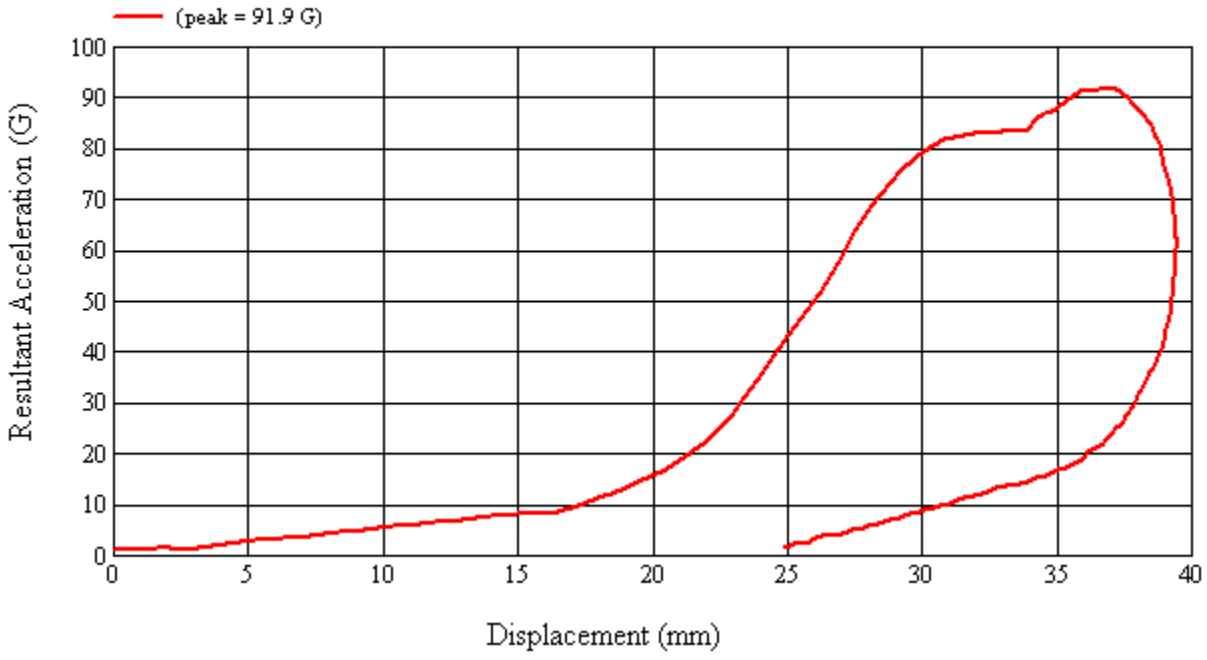
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

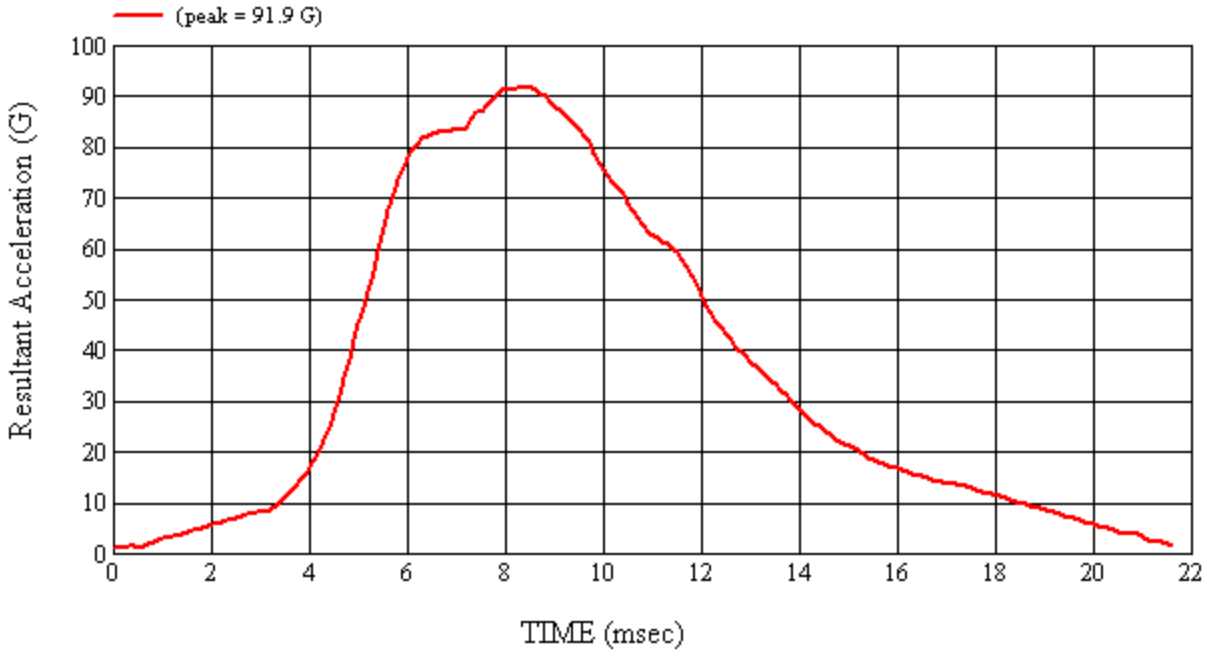
Headliner deformation, dislodged headliner

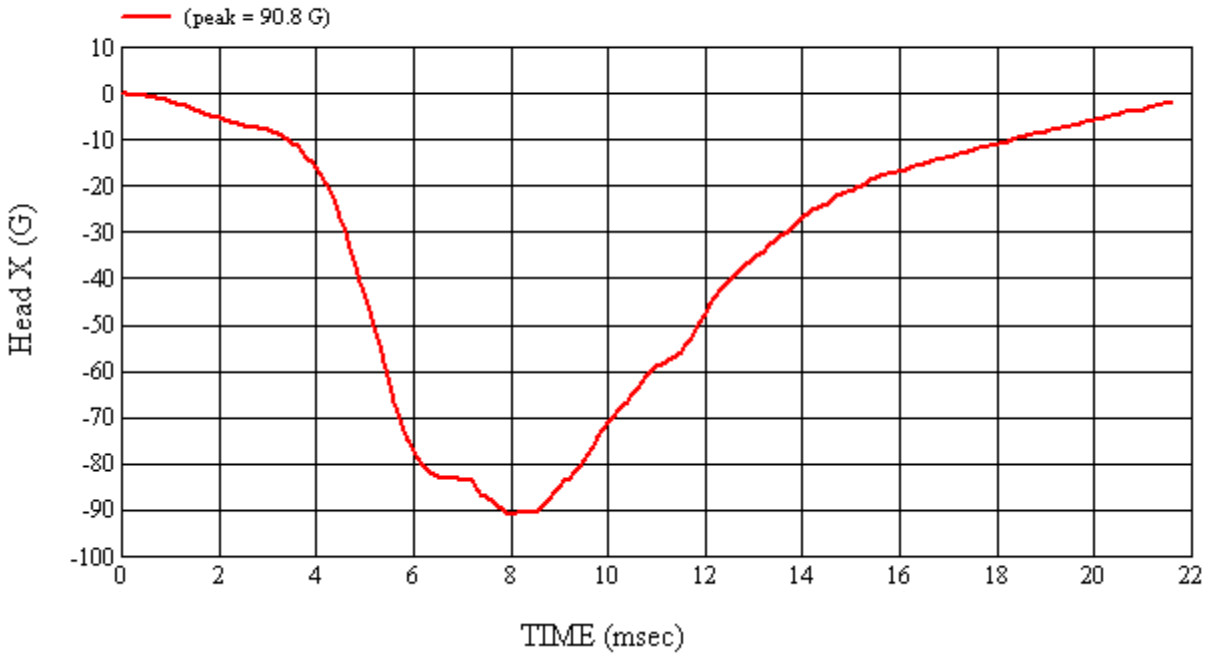
Recorded By: _____ Approved By*: _____ Date: 7/15/2011

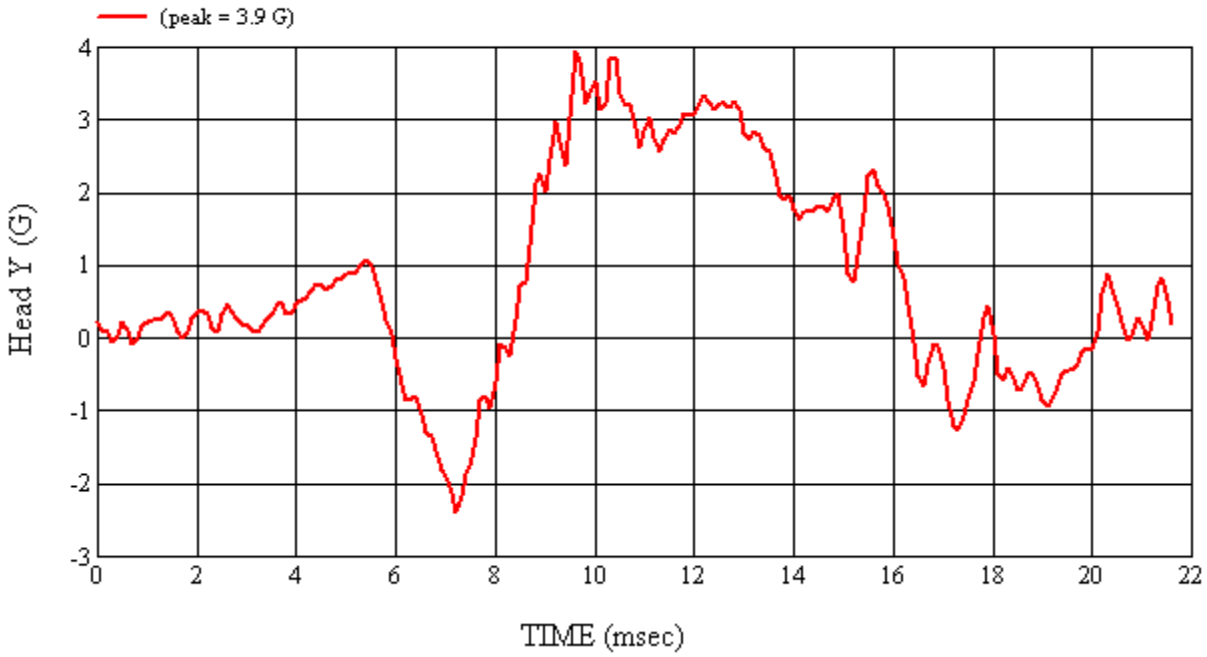
*Only necessary for NHTSA (Government) Compliance testing.

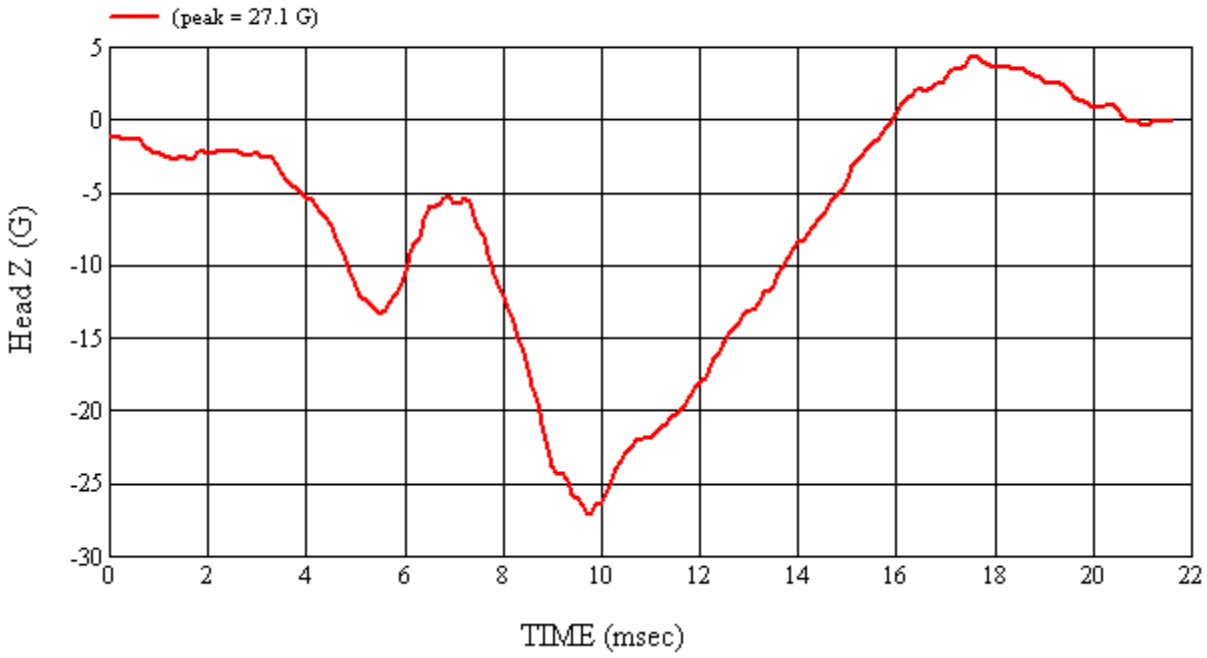
MGA Test #: U11327 Target Location: BP1, Right Side Test Date: 7/15/2011

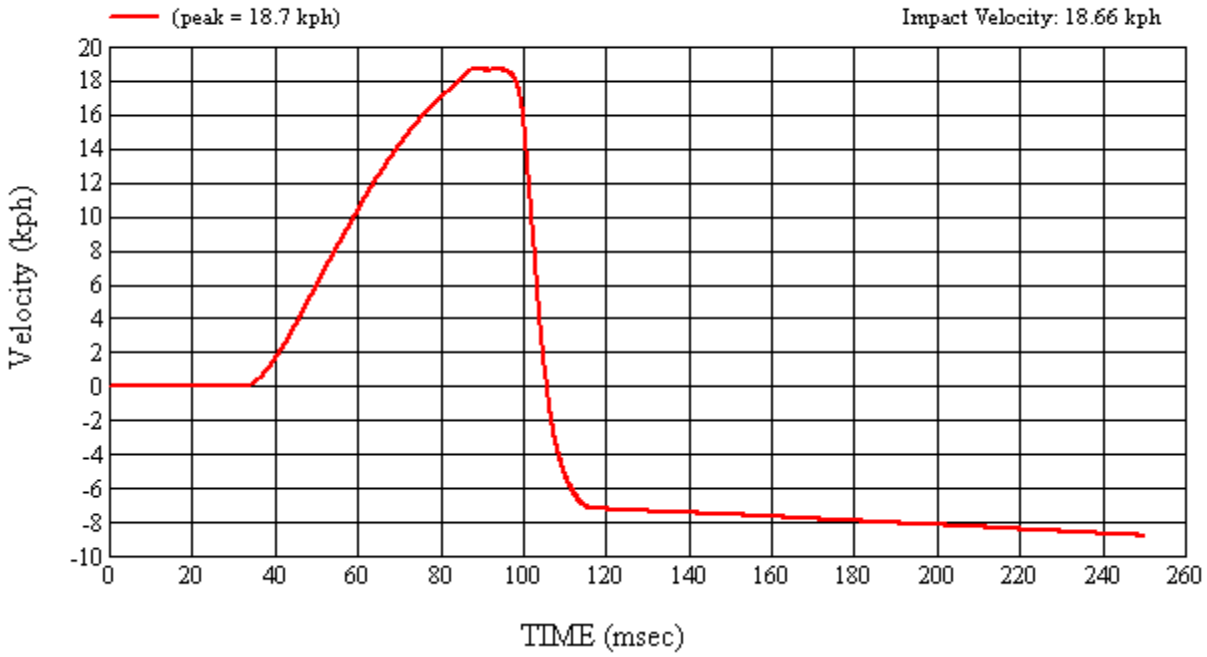


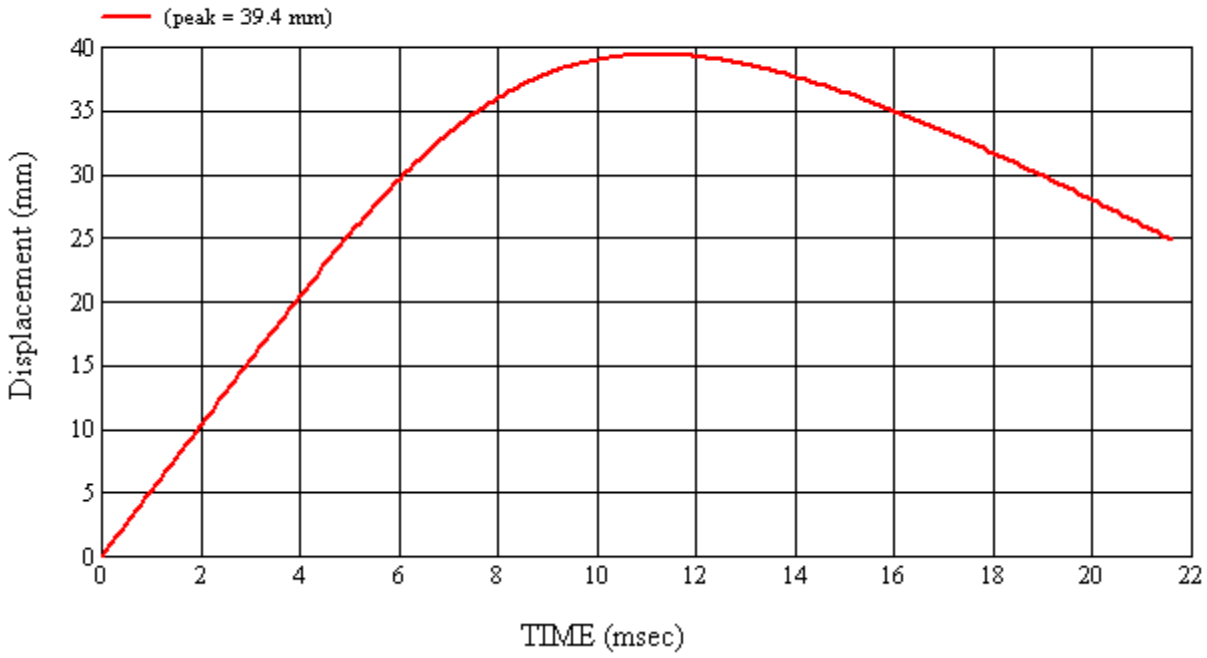



(peak = 90.8 G)
Head X (G)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)

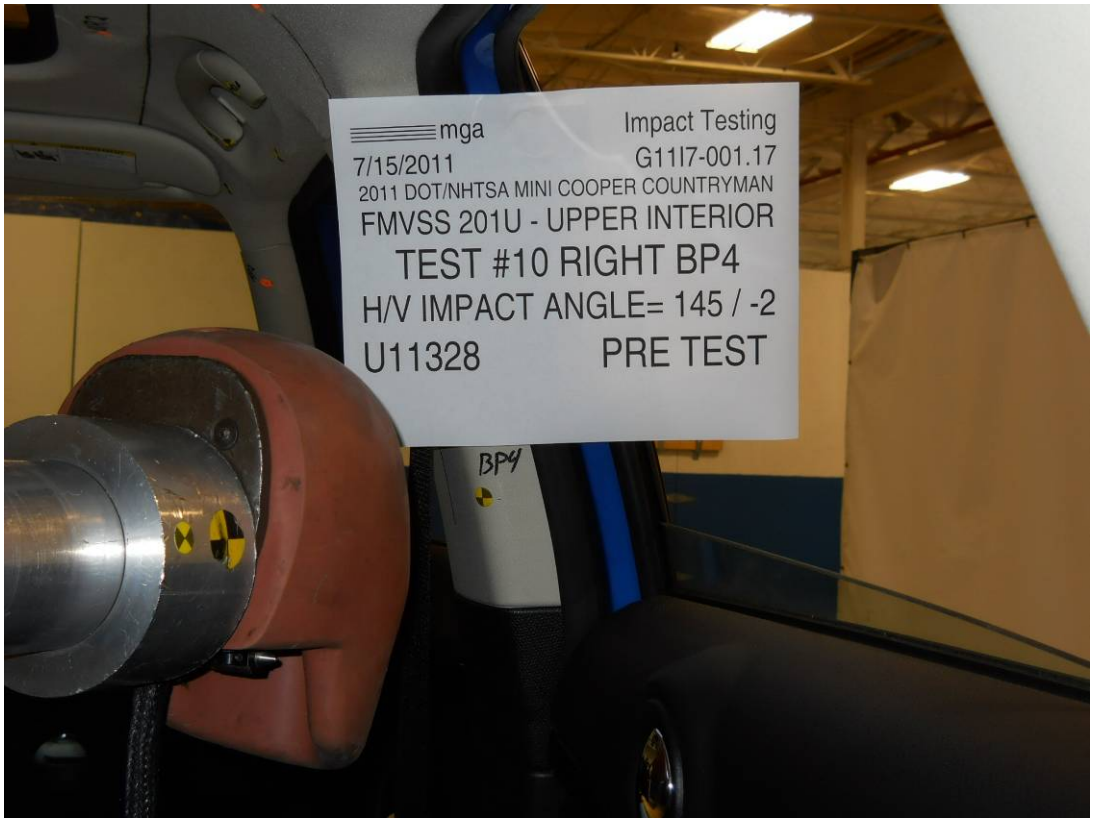

(peak = 3.9 G)
Head Y (G)
4
3
2
1
0
-1
-2
-3
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)

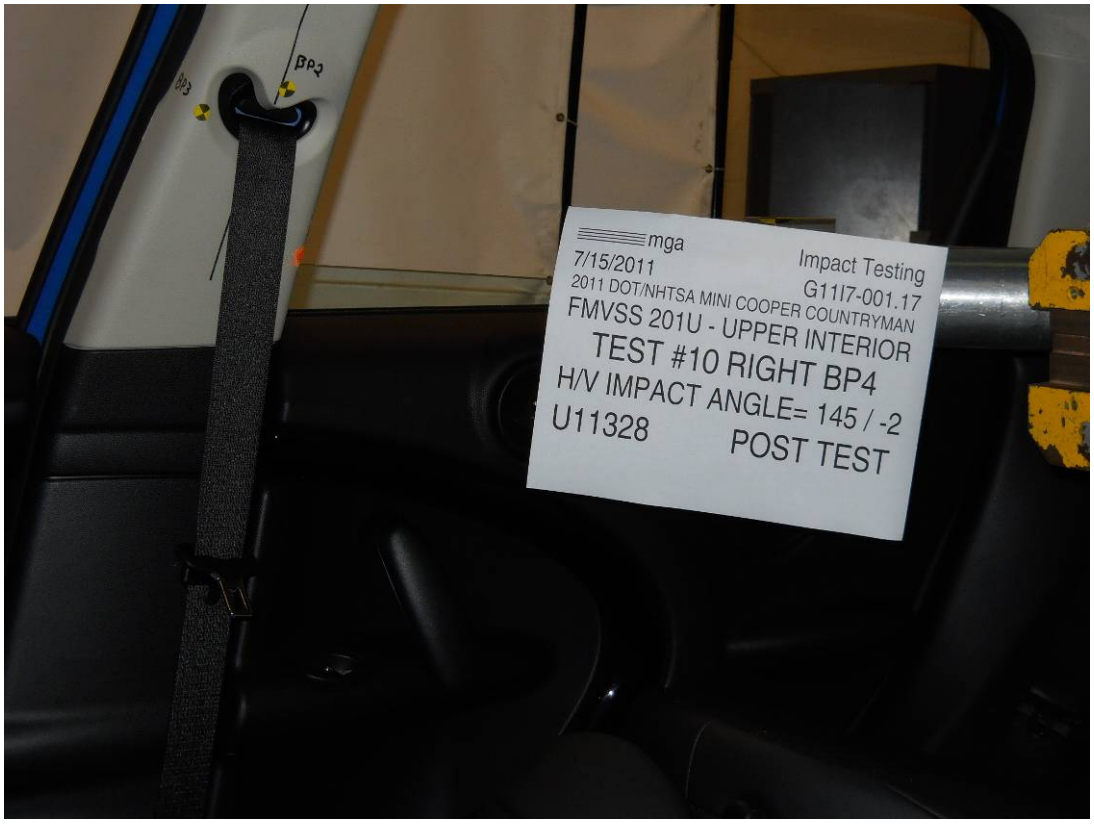

(peak = 27.1 G)
Head Z (G)
5
0
-5
-10
-15
-20
-25
-30
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)

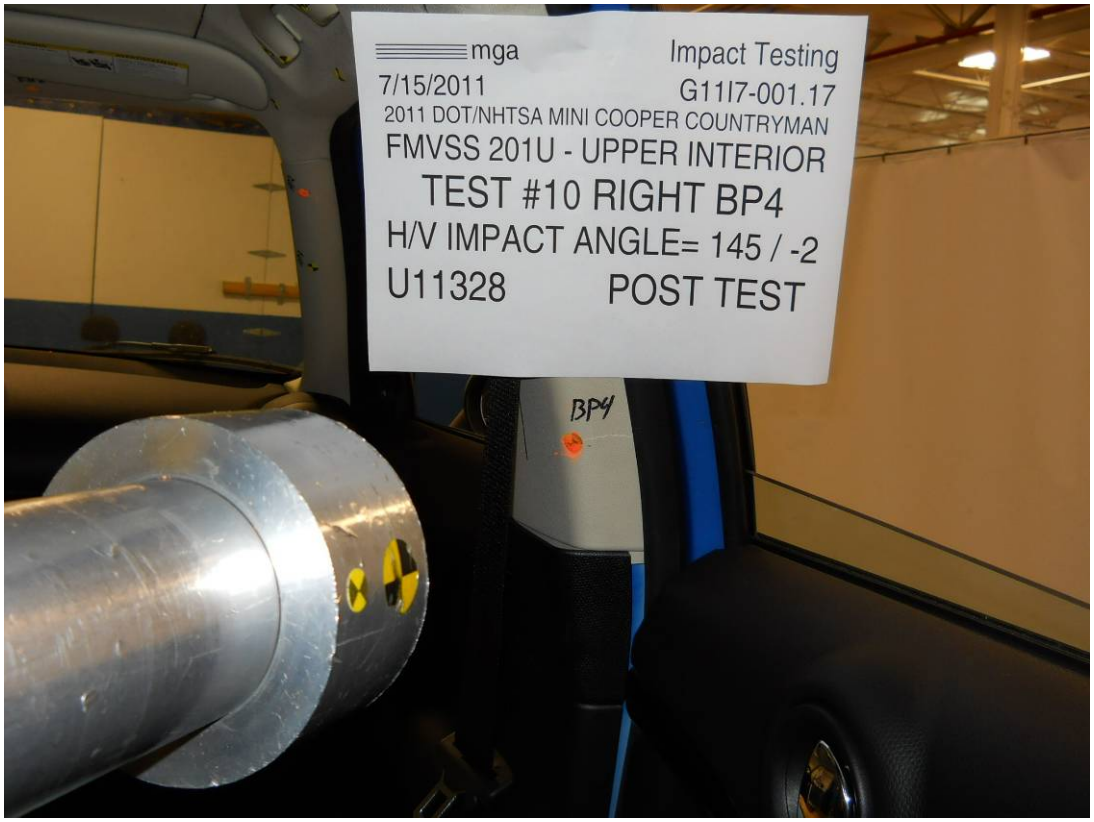

(peak = 18.7 kph)
Impact Velocity: 18.66 kph
Velocity (kph)
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 39.4 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


BP2
mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 145 / -2
U11328
PRE TEST


mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 145 / -2
U11328
PRE TEST
BP4


mga
7/15/2011
Impact Testing
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 145 / -2
U11328
POST TEST


mga
7/15/2011
Impact Testing
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 145 / -2
U11328
POST TEST
BP4


BP4


mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #10 RIGHT BP4
H/V IMPACT ANGLE= 145 / -2
U11328
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#10

Target (Vehicle Side): BP4Right

Temperature:23.2C

MGA Test Reference No.:U11328

Humidity:51.6%

Approach Horizontal Angles:145º

Time of Test:3:22:14 PM

Approach Vertical Angles:-2º

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
541	497	10.3	23.7	11	0

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

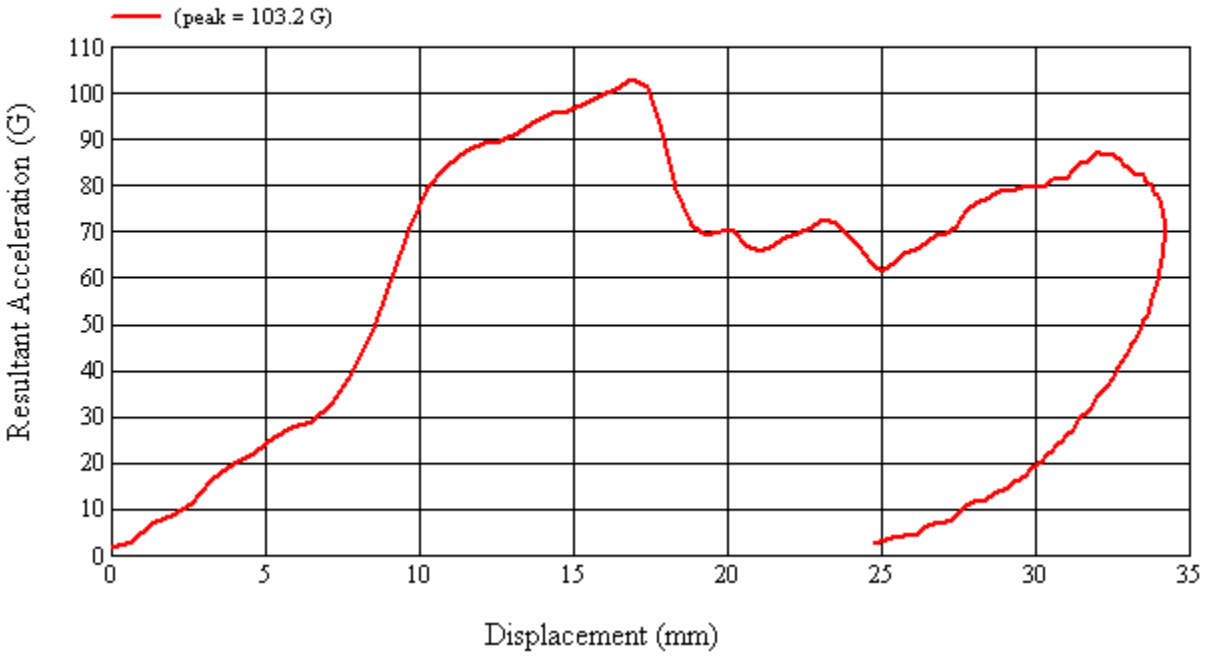
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

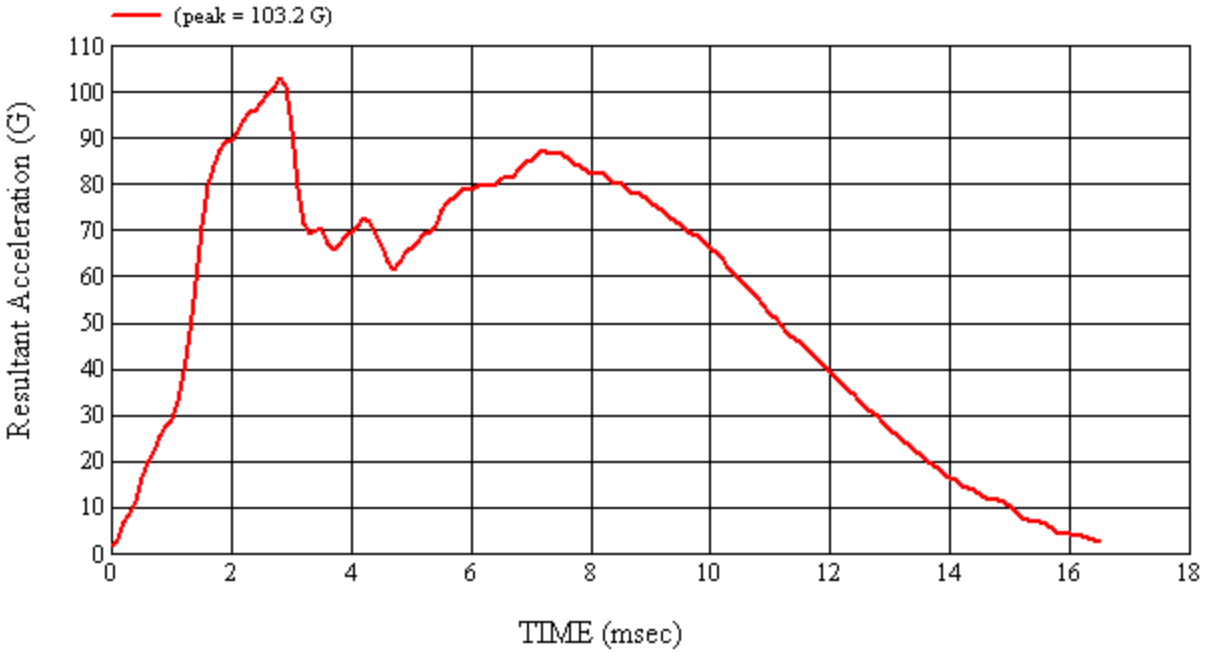
Dislodged trim, cracked trim, stress mark on trim

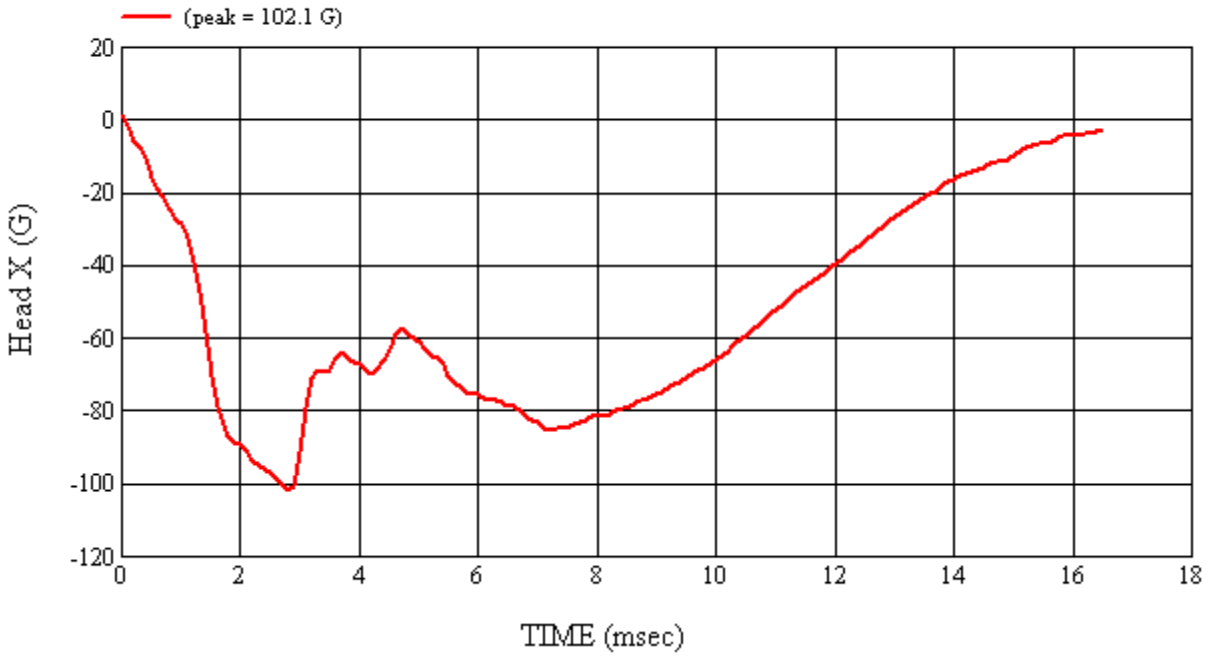
Recorded By: _____ Approved By*: _____ Date: 7/15/2011

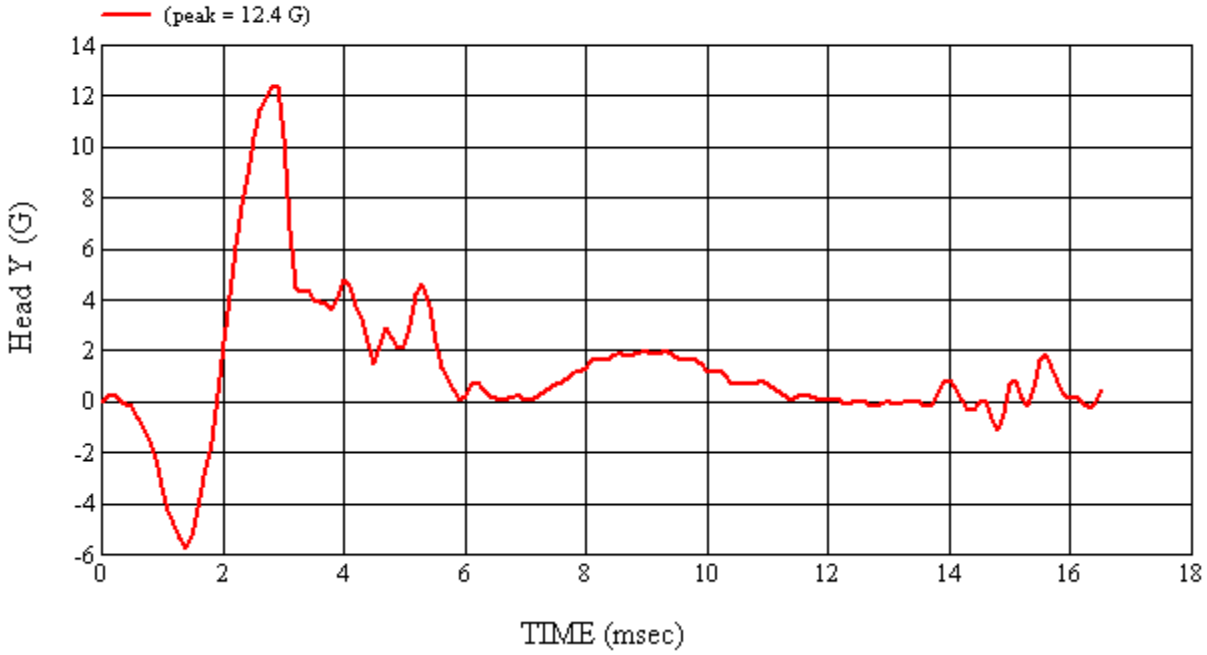
*Only necessary for NHTSA (Government) Compliance testing.

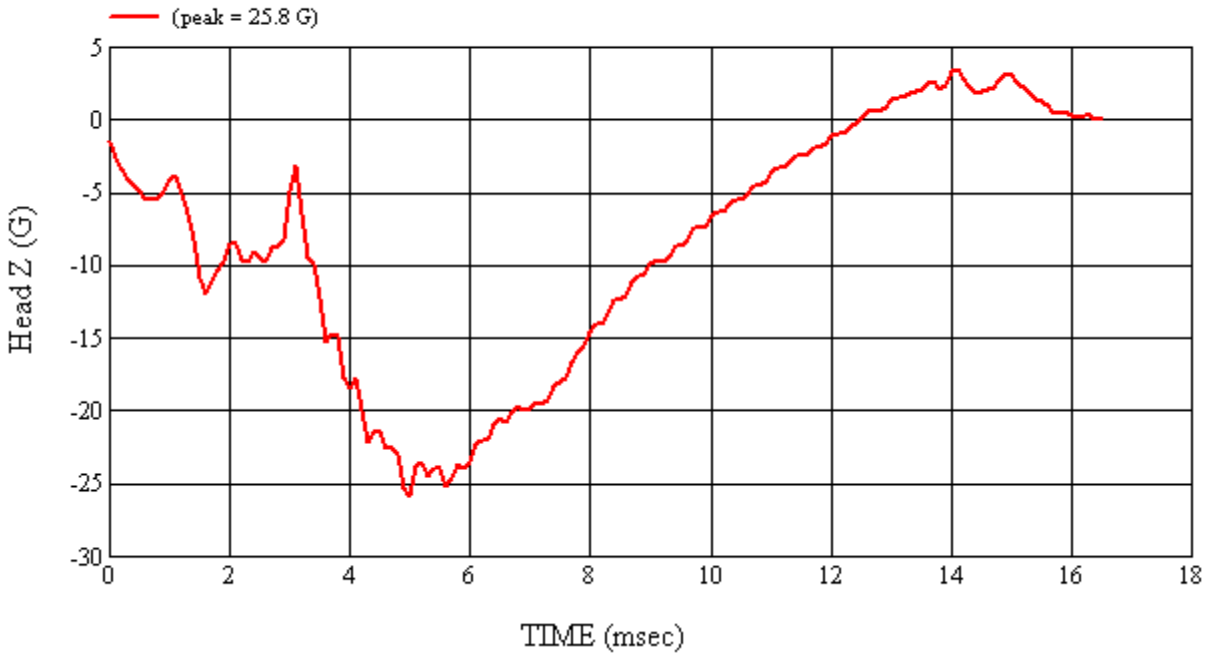
MGA Test #: U11328 Target Location: BP4, Right Side Test Date: 7/15/2011

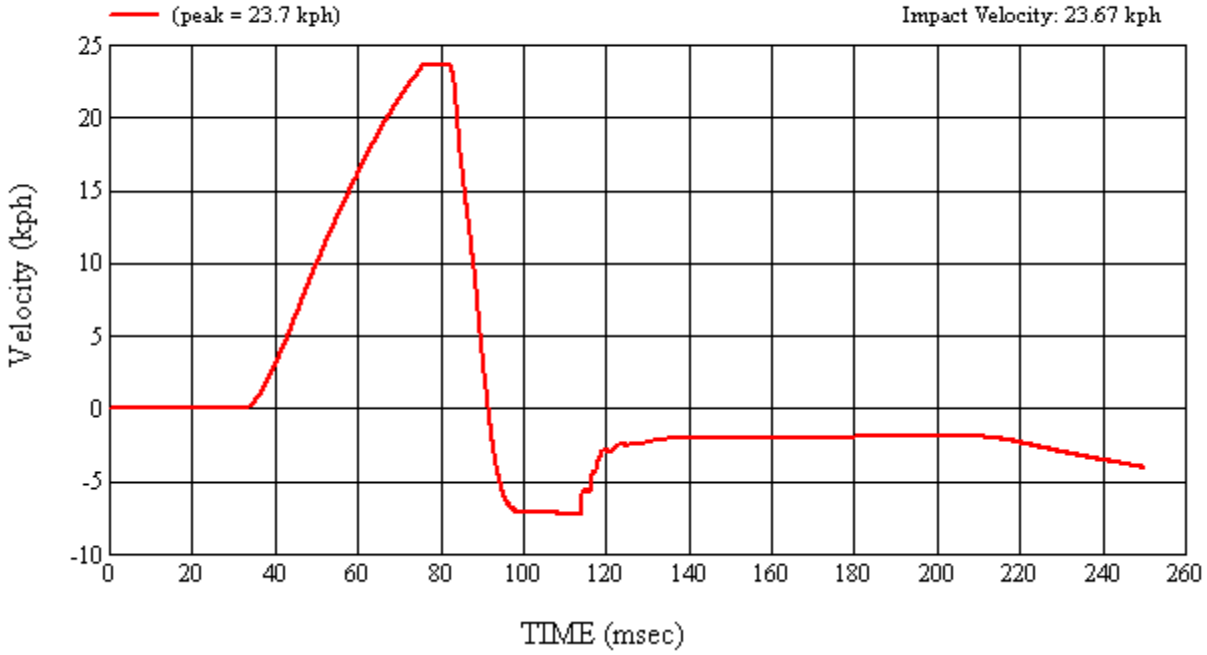


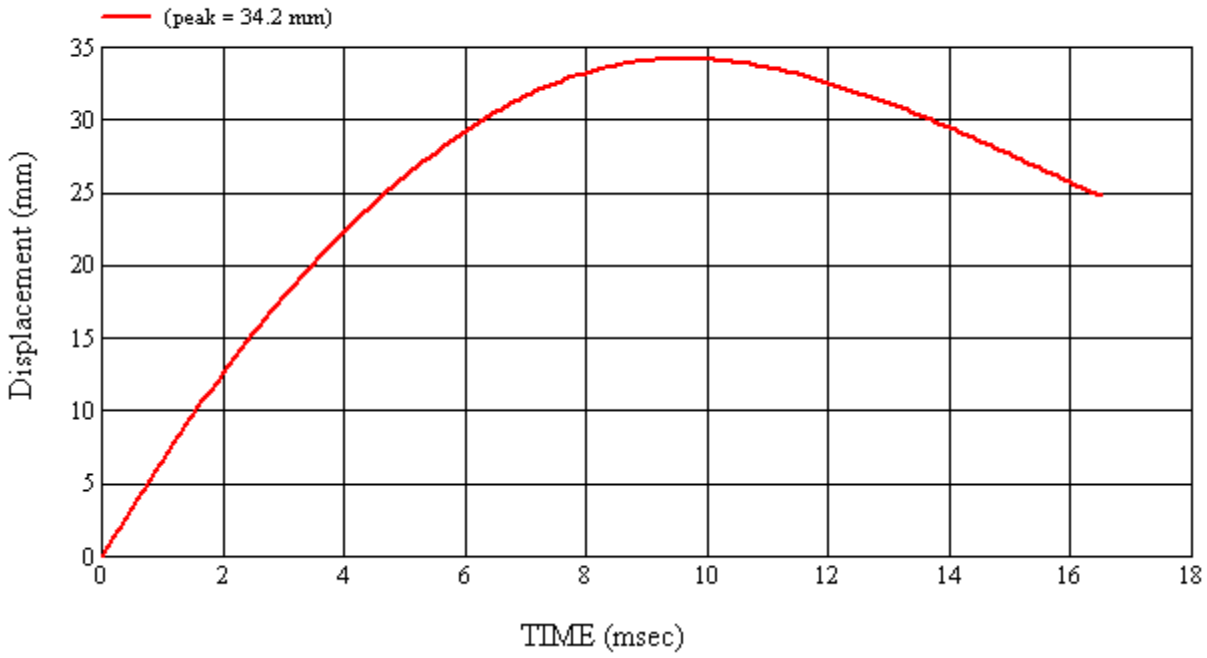



(peak = 102.1 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
0
2
4
6
8
10
12
14
16
18
TIME (msec)

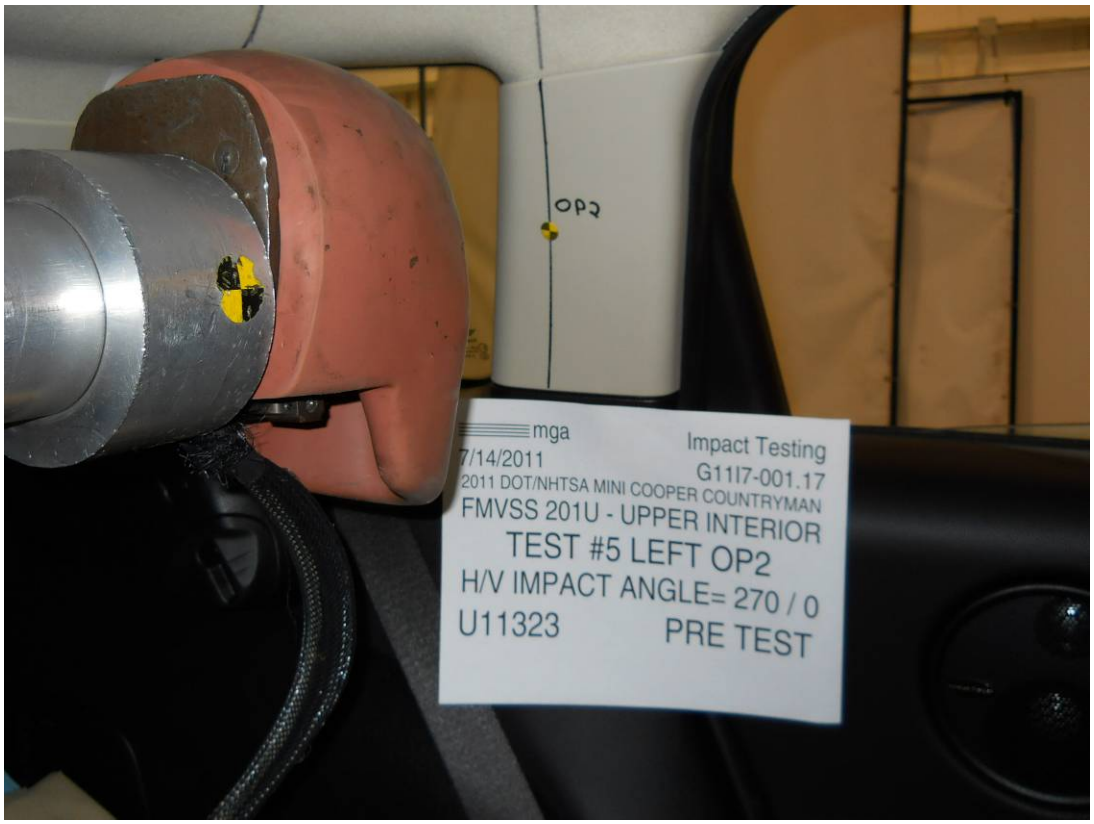

(peak = 12.4 G)
Head Y (G)
14
12
10
8
6
4
2
0
-2
-4
-6
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 25.8 G)
Head Z (G)
5
0
-5
-10
-15
-20
-25
-30
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 23.7 kph)
Impact Velocity: 23.67 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 = 34.2 mm)
Displacement (mm)
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
TIME (msec)

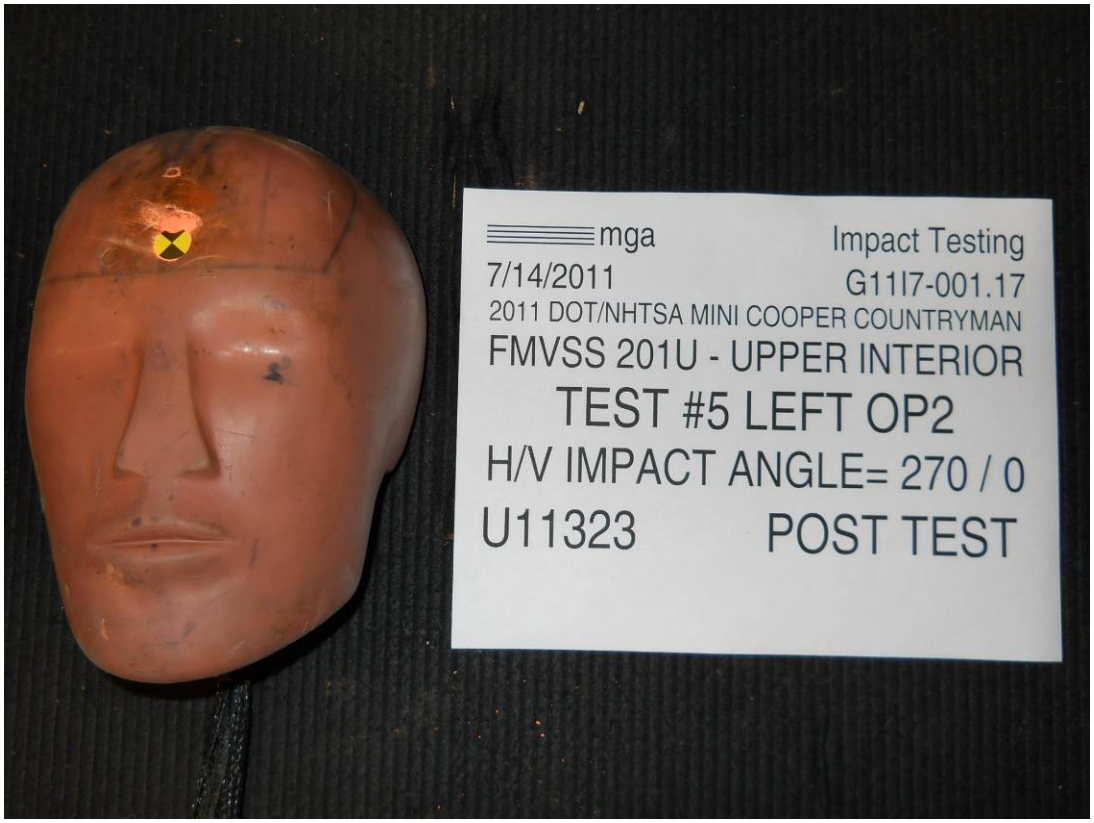

CB0508
U11323
LEFT OP2
H/V 270/0
mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT OP2
H/V IMPACT ANGLE= 270 / 0
U11323
PRE TEST


OP2
mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT OP2
H/V IMPACT ANGLE= 270 / 0
U11323
PRE TEST


RH
CB0508
U11323
LEFT OP2
H/V 270/0
RPJ
mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT OP2
H/V IMPACT ANGLE= 270 / 0
U11323
POST TEST


CB0508
U11323
LEFT OP2
OP2
mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT OP2
H/V IMPACT ANGLE= 270 / 0
U11323
POST TEST


OP2


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #5 LEFT OP2
H/V IMPACT ANGLE= 270 / 0
U11323
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#5

Target (Vehicle Side): OP2Left

Temperature:22.3C

MGA Test Reference No.:U11323

Humidity:52.8%

Approach Horizontal Angles:270º

Time of Test:2:33:59 PM

Approach Vertical Angles:0º

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
797	836	6.6	23.6	10	1 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	1.06
Y	6	J14103	93.9	0.85	0.85
Z	7	J35800	97.8	0.94	0.94

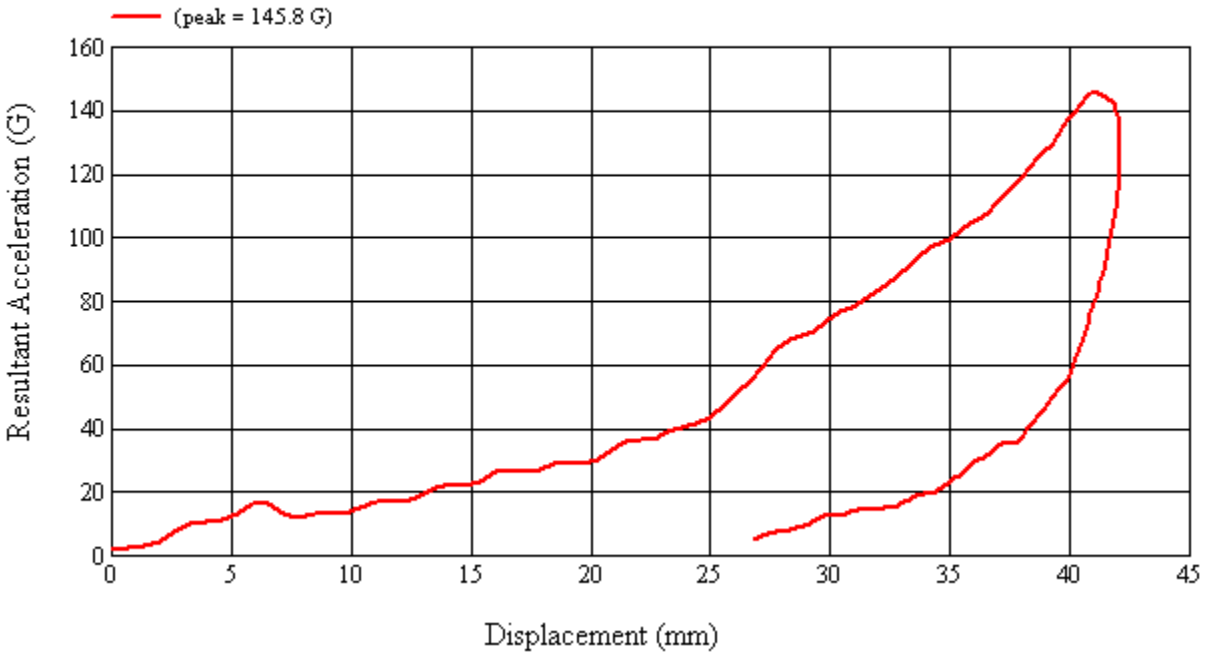
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

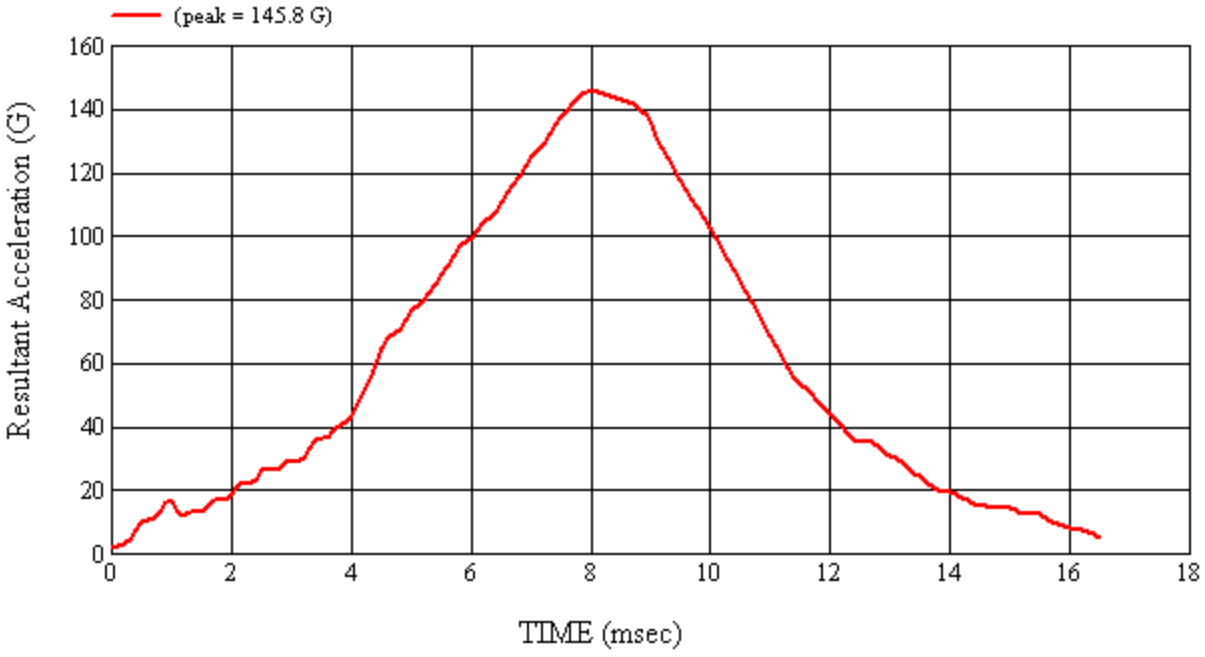
Dislodged headliner, stress marks on pillar trim

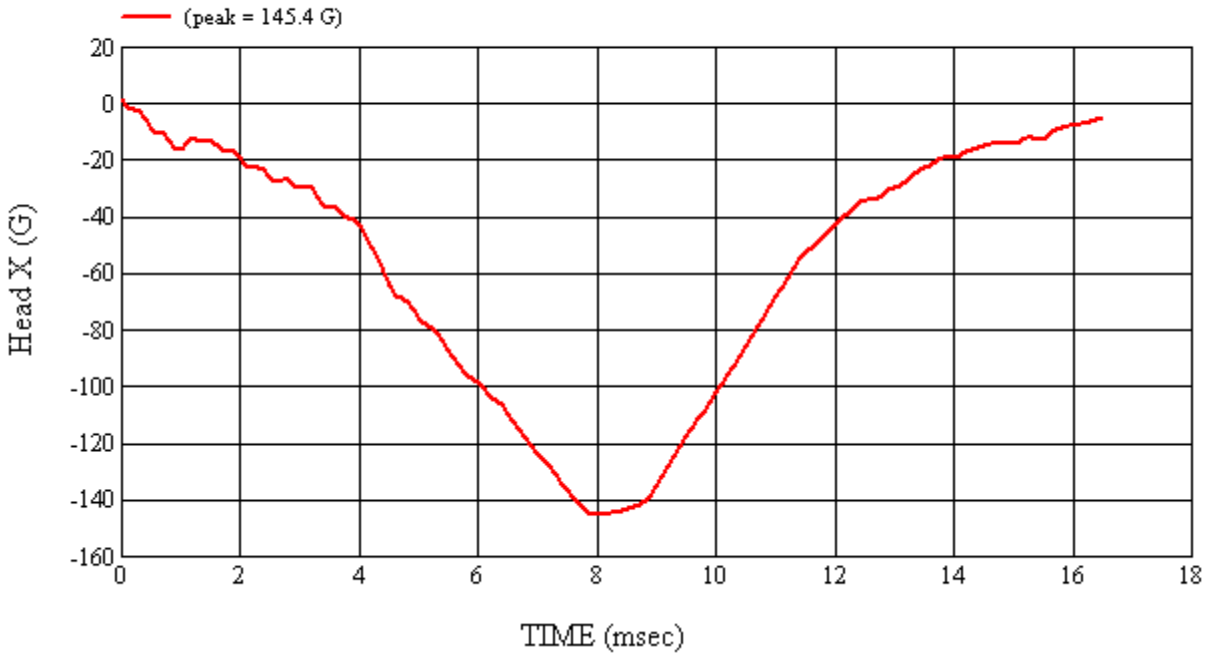
Recorded By: _____ Approved By*: _____ Date: 7/14/2011

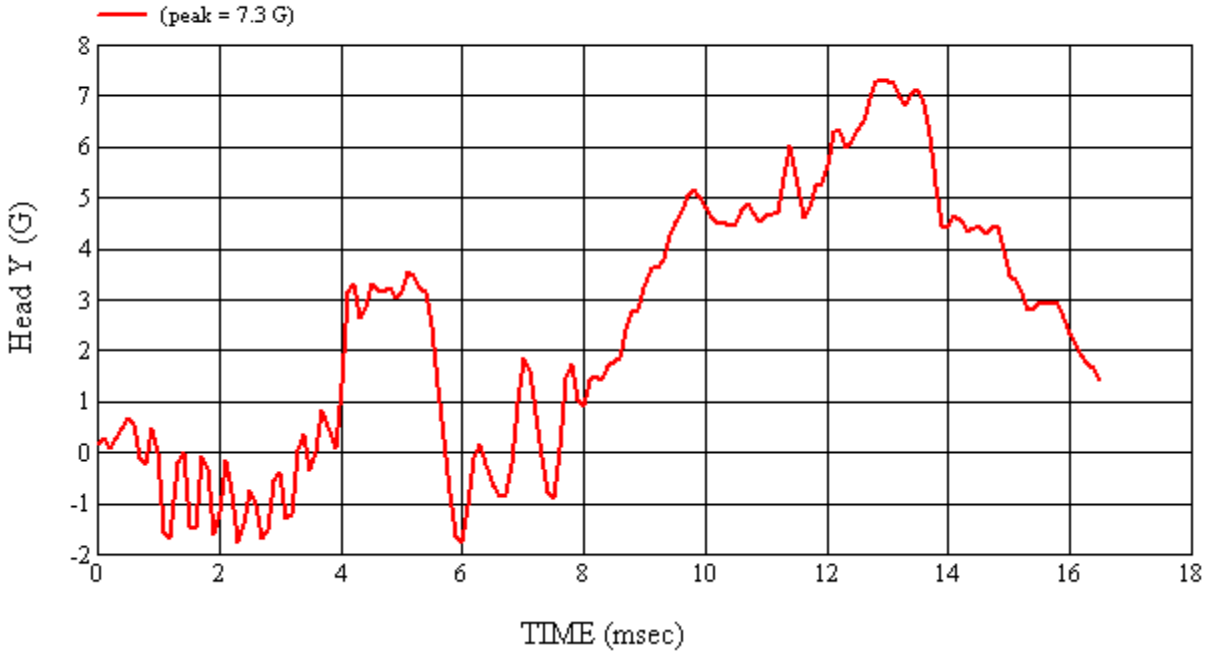
*Only necessary for NHTSA (Government) Compliance testing.

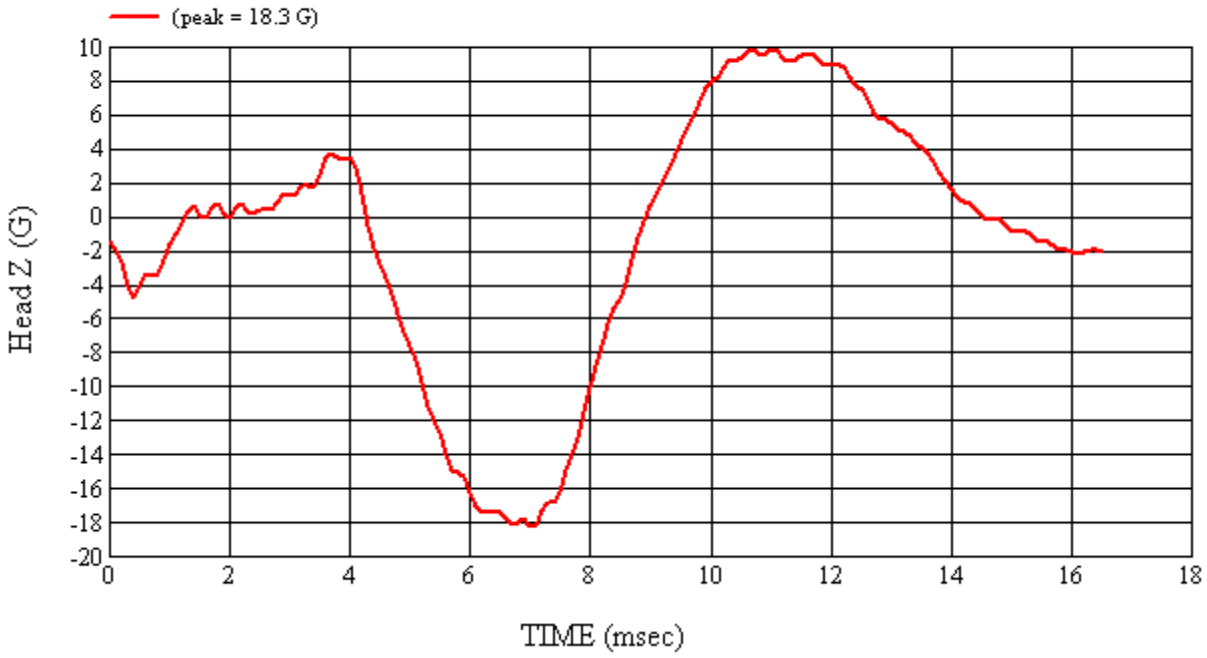
MGA Test #: U11323 Target Location: OP2, Left Side Test Date: 7/14/2011

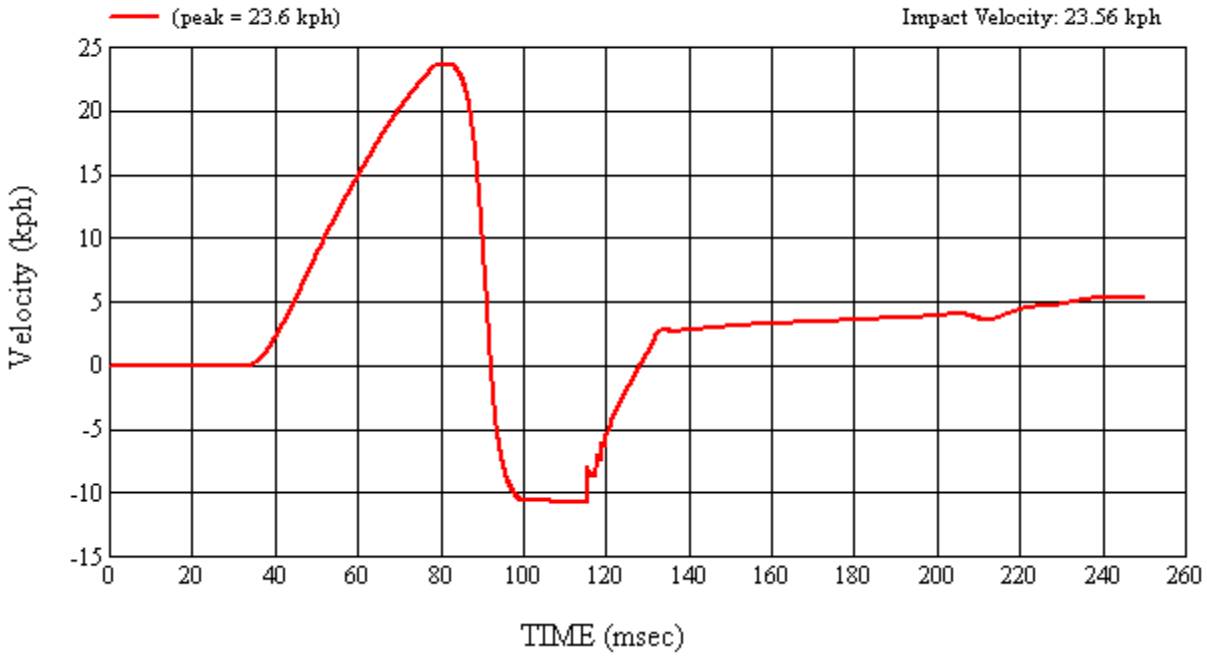


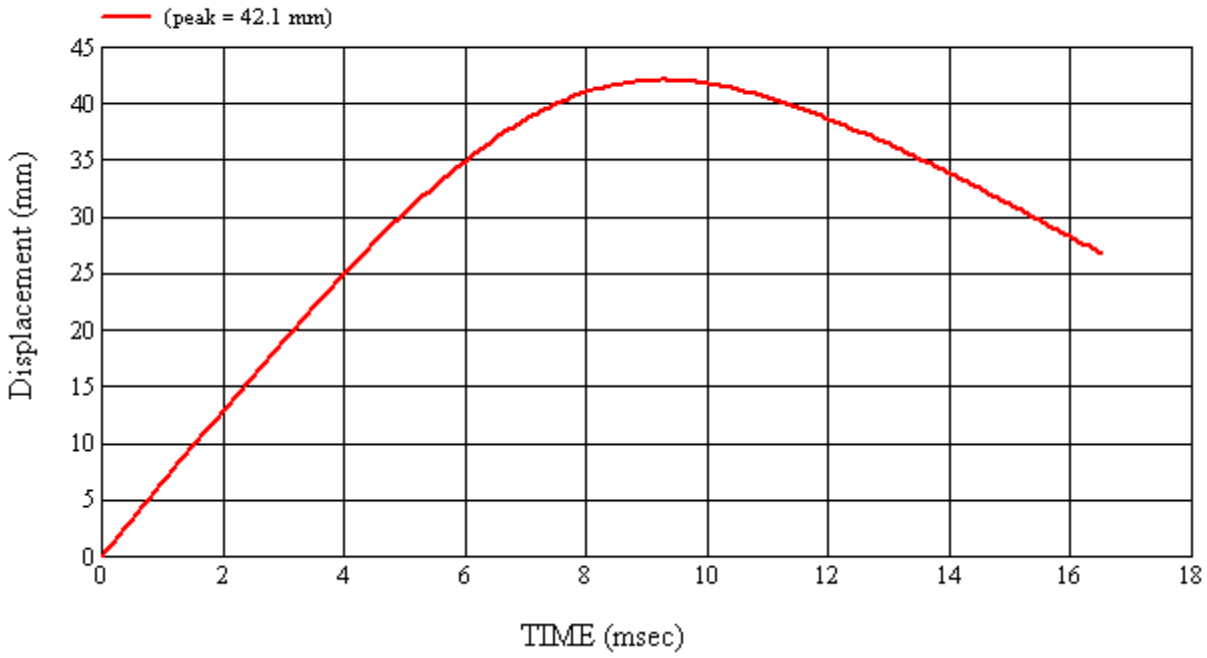


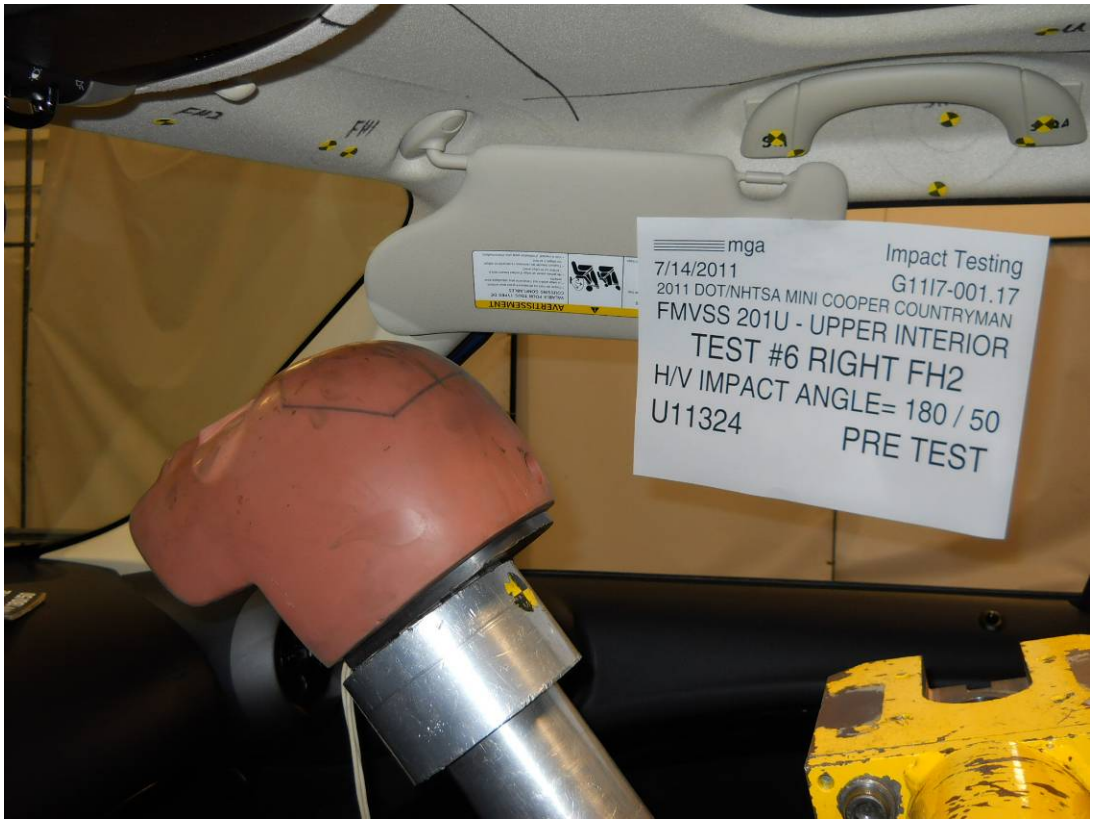

(peak = 145.4 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
-160
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 7.3 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
TIME (msec)

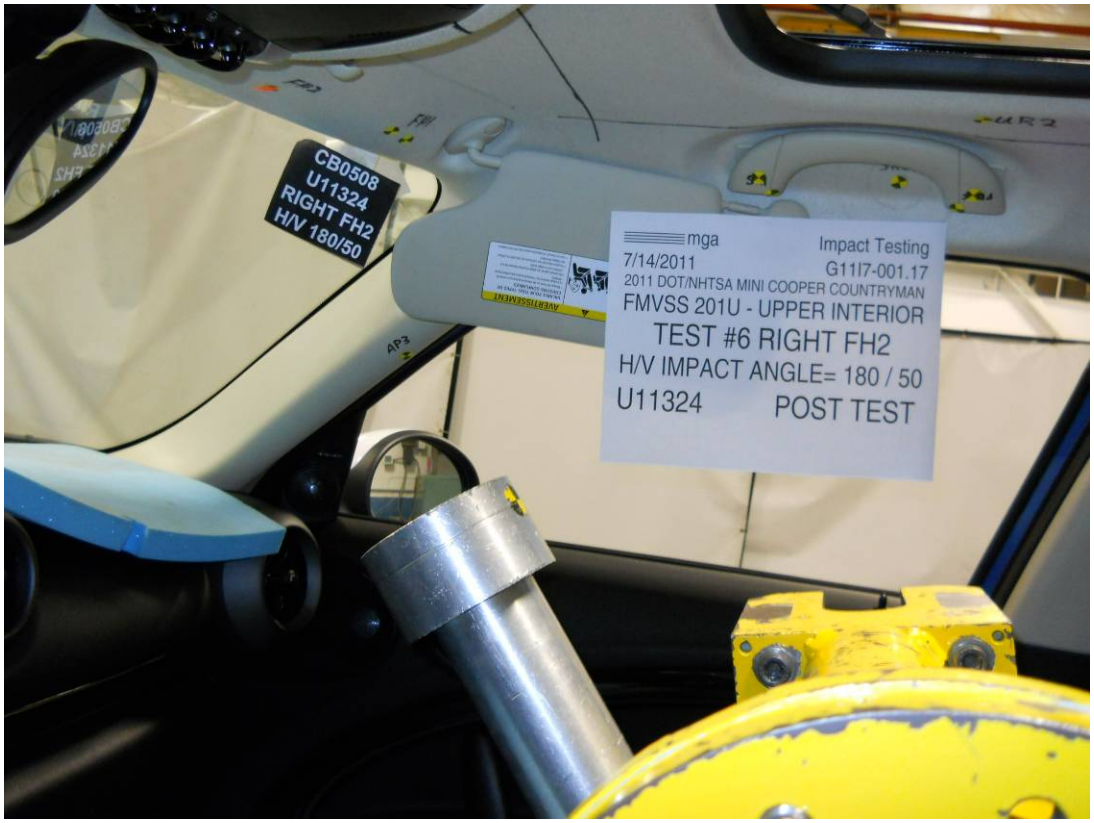

(peak = 18.3 G)
Head Z (G)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
0
2
4
6
8
10
12
14
16
18
TIME (msec)

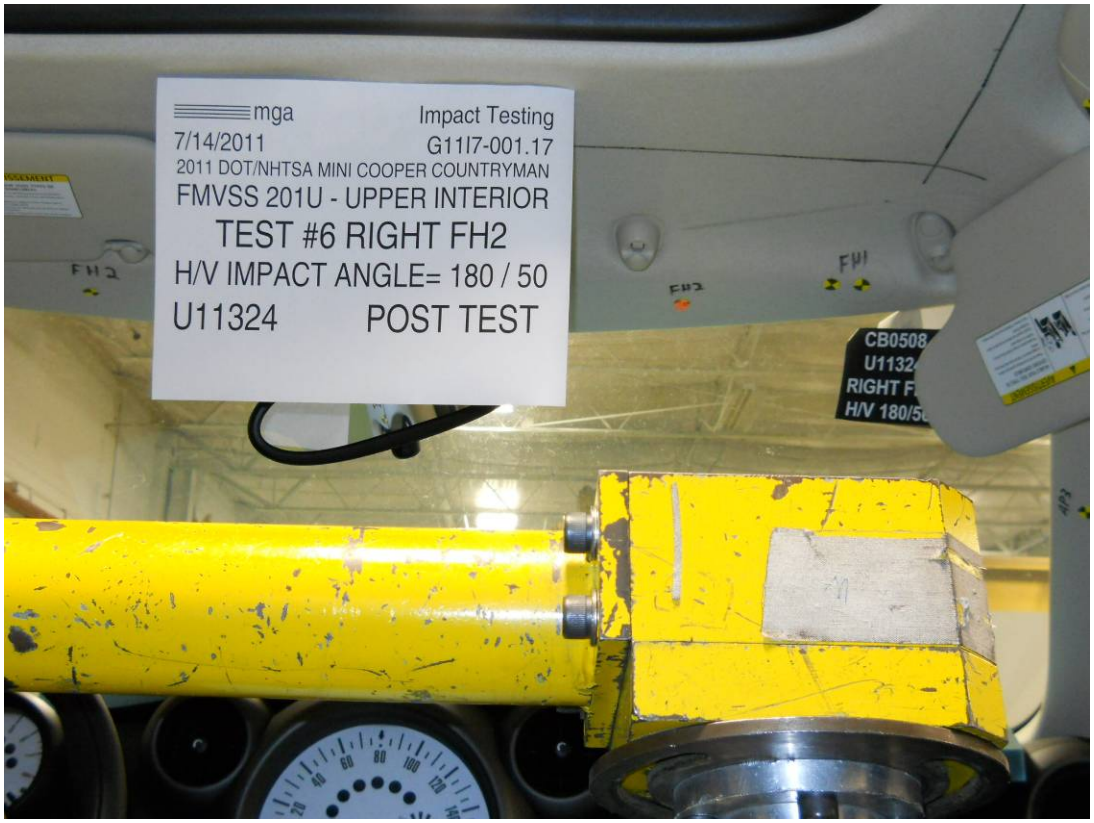

(peak = 23.6 kph)
Impact Velocity: 23.56 kph
Velocity (kph)
25
20
15
10
5
0
-5
-10
-15
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)


(peak = 42.1 mm)
Displacement (mm)
45
40
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
TIME (msec)


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #6 RIGHT FH2
H/V IMPACT ANGLE= 180 / 50
U11324
PRE TEST


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #6 RIGHT FH2
H/V IMPACT ANGLE= 180 / 50
U11324
PRE TEST


CB0508
U11324
RIGHT FH2
H/V 180/50
mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #6 RIGHT FH2
H/V IMPACT ANGLE= 180 / 50
U11324
POST TEST


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #6 RIGHT FH2
H/V IMPACT ANGLE= 180 / 50
U11324
POST TEST
FH2
FH1
CB0508


FH1
FH2


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #6 RIGHT FH2
H/V IMPACT ANGLE= 180 / 50
U11324
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#6

Target (Vehicle Side): FH2Right

Temperature:22.6C

MGA Test Reference No.:U11324

Humidity:52.2%

Approach Horizontal Angles:180º

Time of Test:4:28:08 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
683	685	6.4	23.6	29	3 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

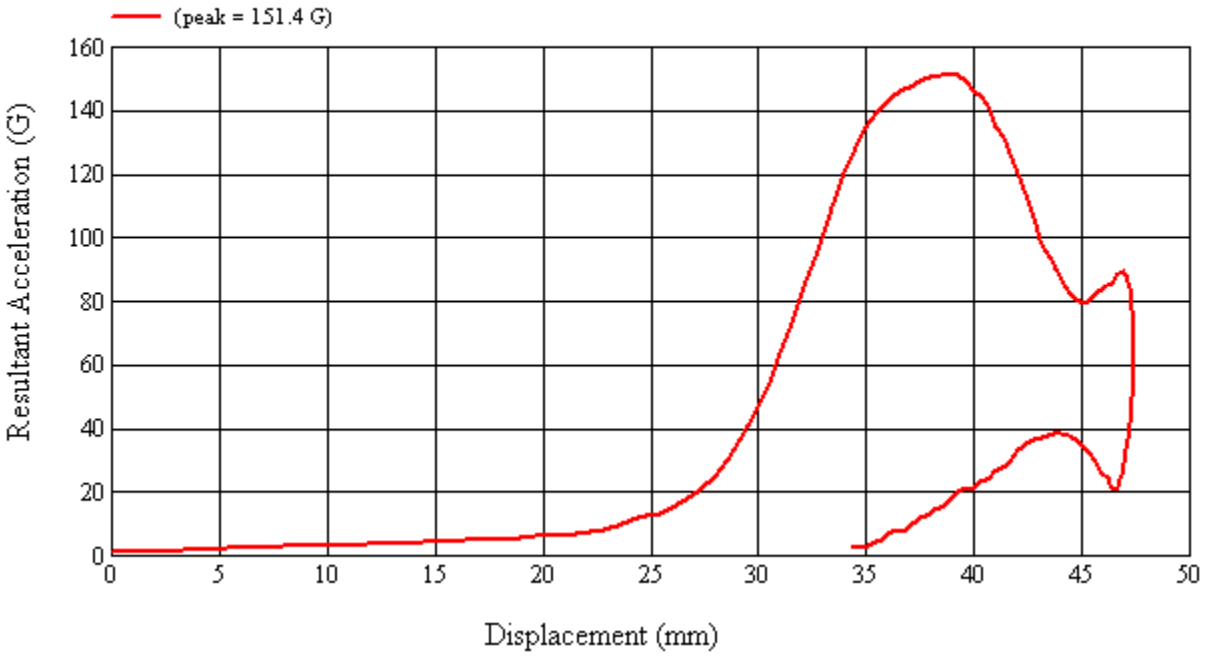
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

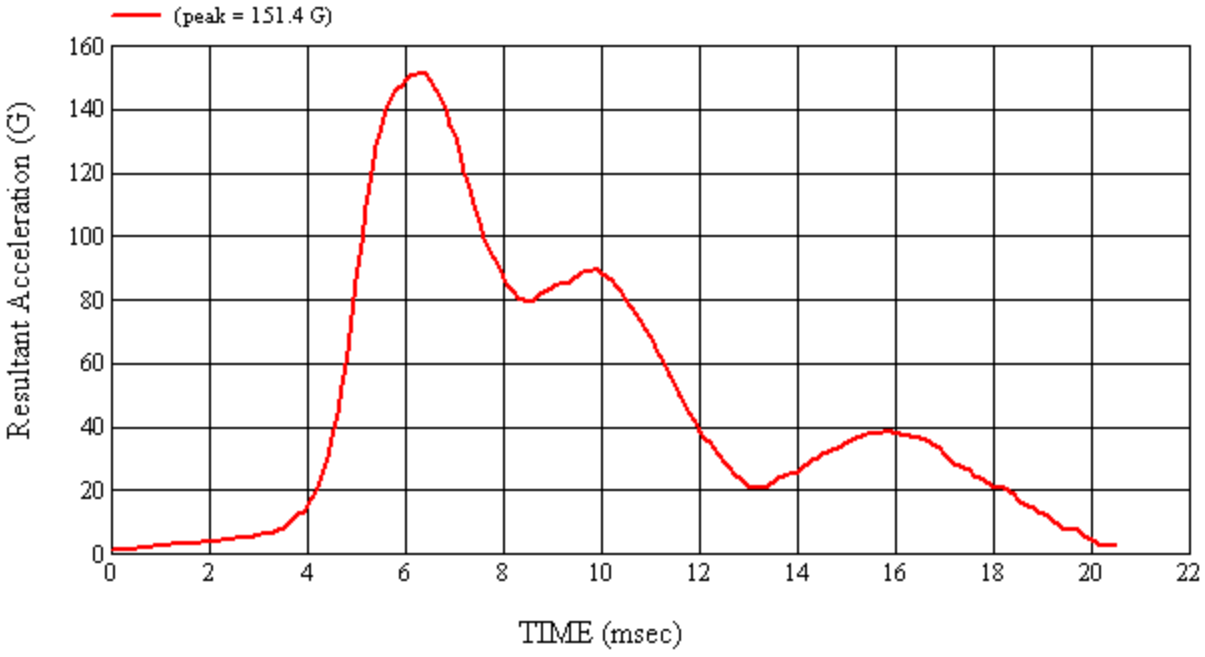
Headliner deformation

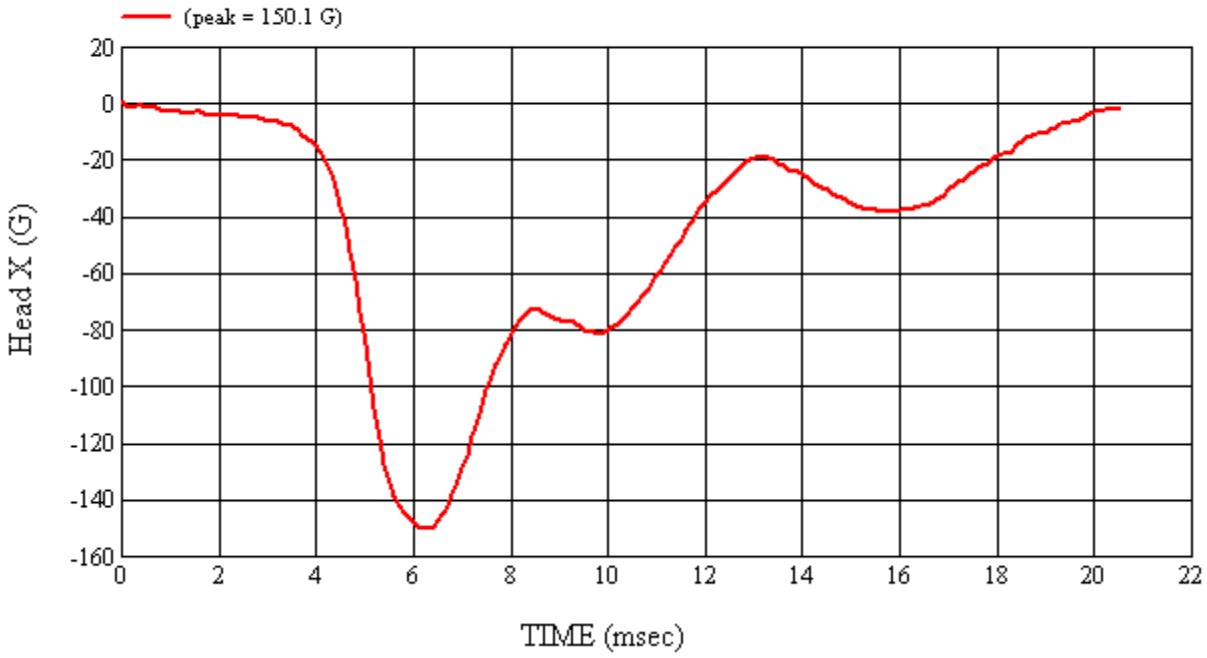
Recorded By: _____ Approved By*: _____ Date: 7/14/2011

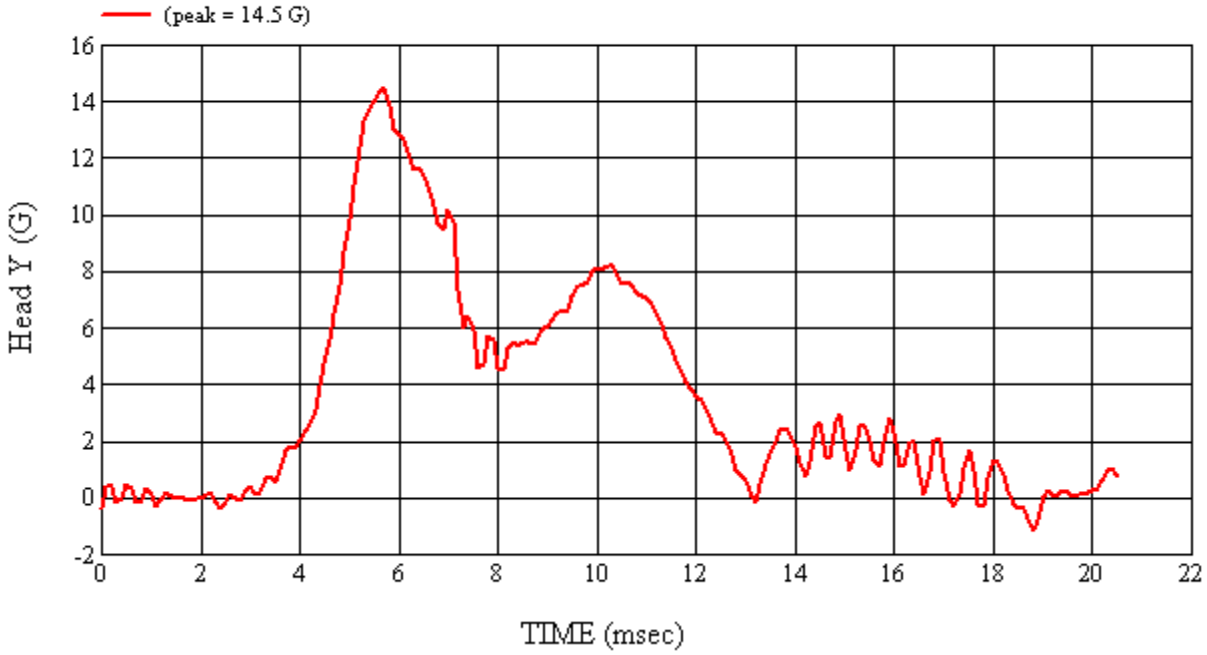
*Only necessary for NHTSA (Government) Compliance testing.

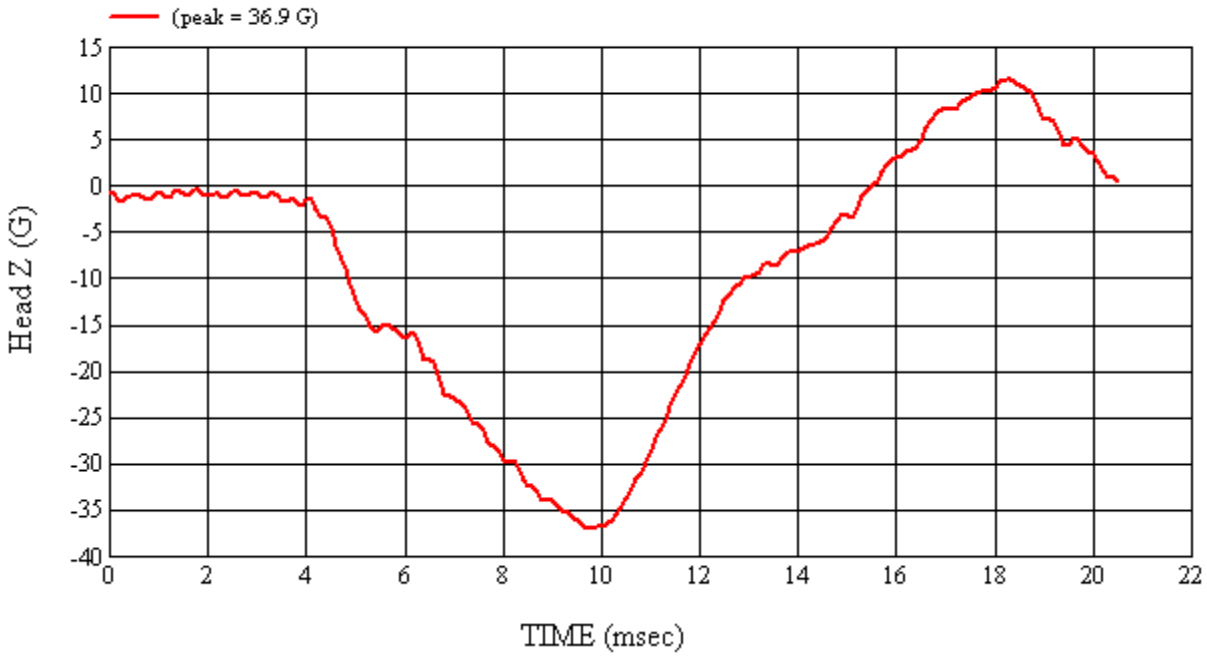
MGA Test #: U11324 Target Location: FH2, Right Side Test Date: 7/14/2011

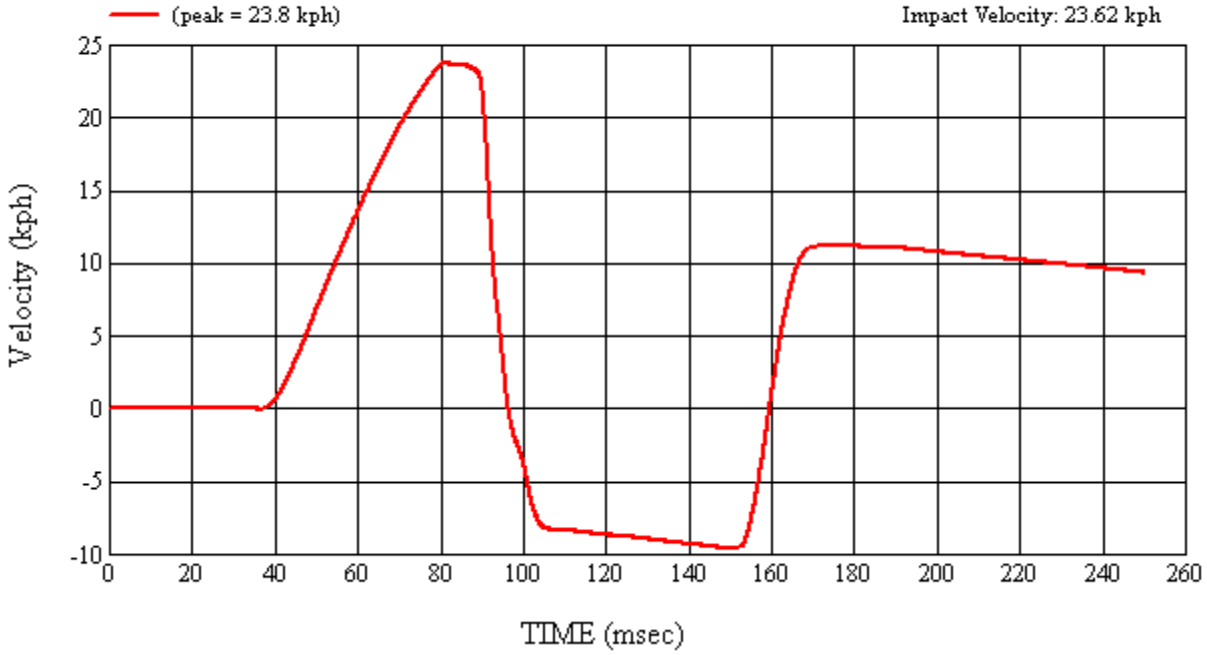


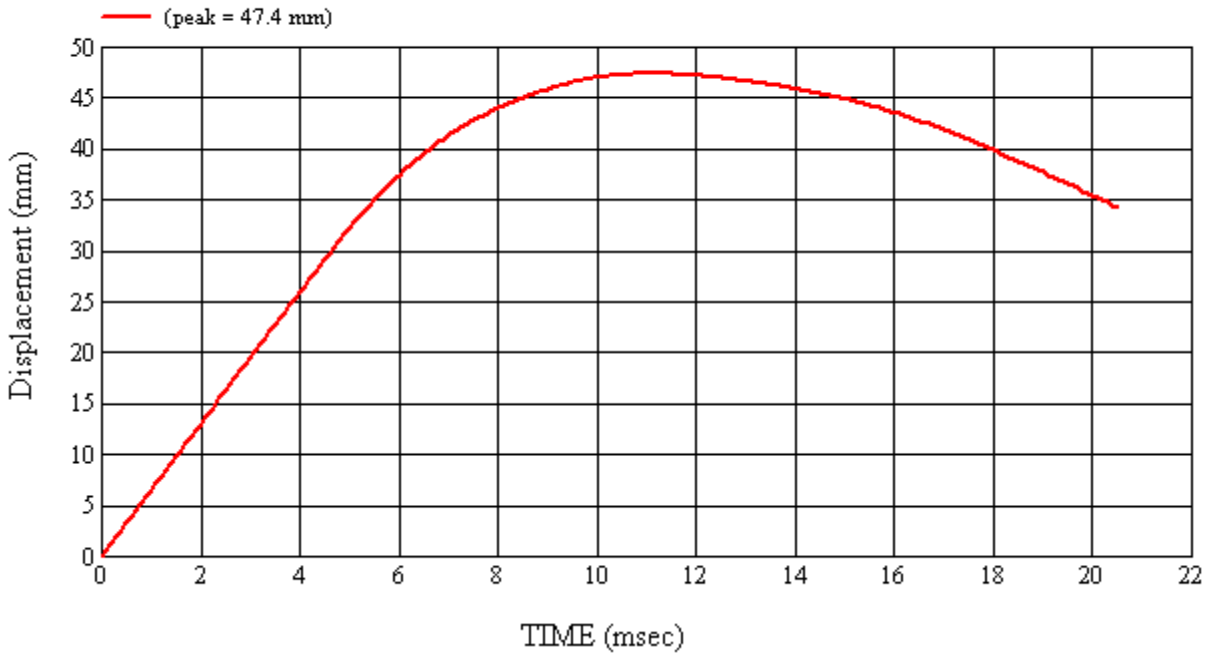



(peak = 150.1 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
-160
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)

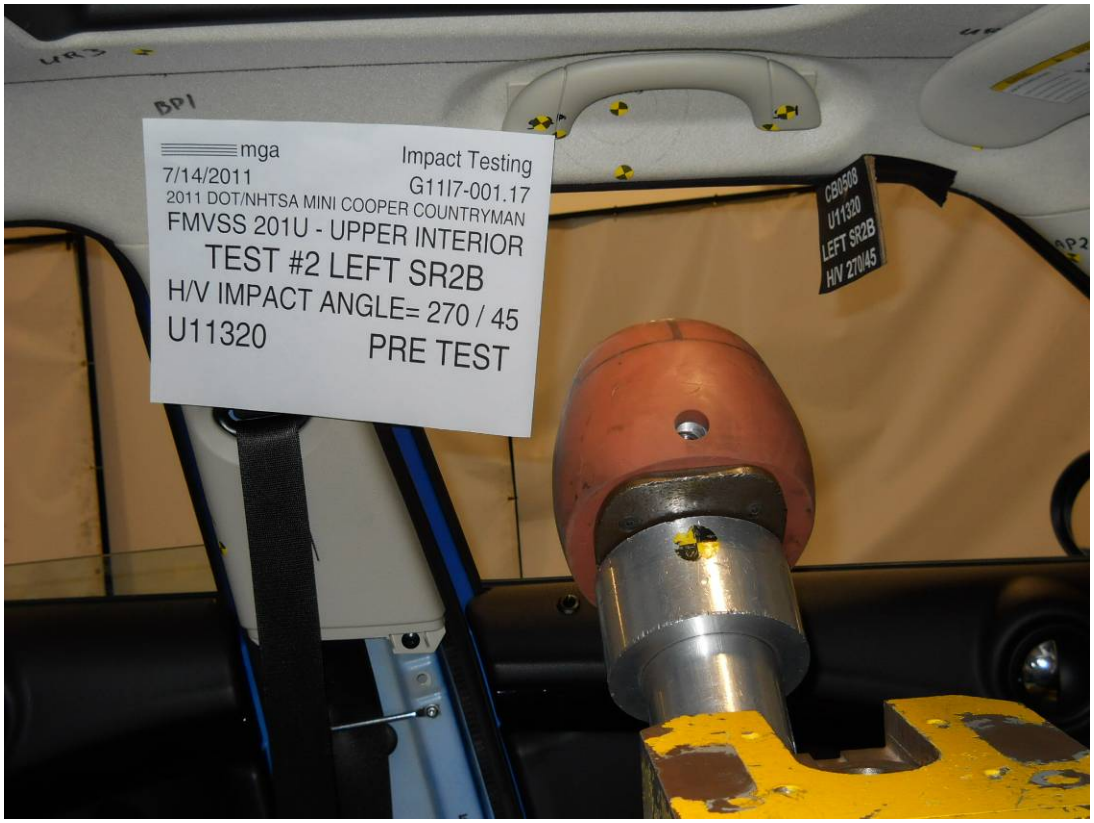

(peak = 14.5 G)
Head Y (G)
16
14
12
10
8
6
4
2
0
-2
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


(peak = 36.9 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
22
TIME (msec)


(peak = 23.8 kph)
Impact Velocity: 23.62 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)

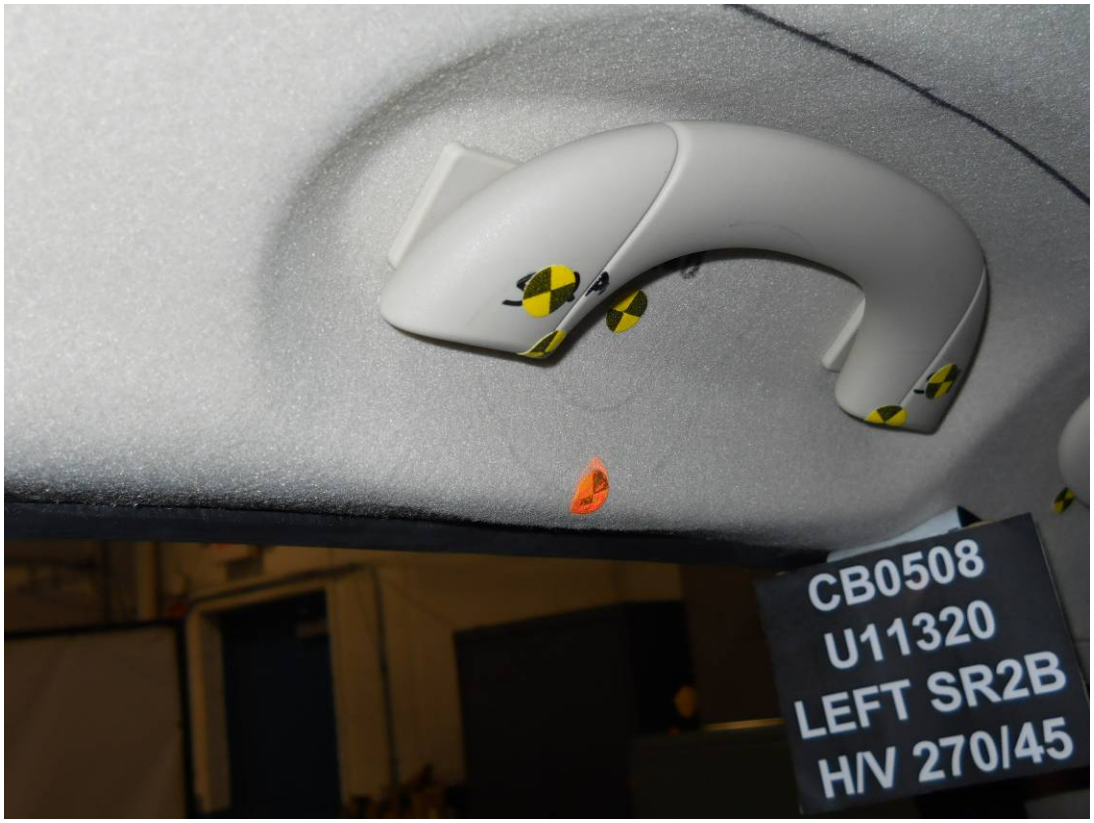

(peak = 47.4 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
50
0
2
4
6
8
10
12
14
16
18
20
22
TIME (msec)


CB0508
U11320
LEFT SR2B
H/V 270/45
BPH
mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT SR2B
H/V IMPACT ANGLE= 270 / 45
U11320
PRE TEST


BPI
mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT SR2B
H/V IMPACT ANGLE= 270 / 45
U11320
PRE TEST
CB0508
U11320
LEFT SR2B
H/V 270/45


CB0508
U11320
LEFT SR2B
H/V 270/45
mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT SR2B
H/V IMPACT ANGLE= 270 / 45
U11320
POST TEST


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT SR2B
H/V IMPACT ANGLE= 270 / 45
U11320
POST TEST
CB0508
U11320
LEFT SR2B
H/V 270/45


CB0508
U11320
LEFT SR2B
H/V 270/45


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #2 LEFT SR2B
H/V IMPACT ANGLE= 270 / 45
U11320
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#2

Target (Vehicle Side): SR2BLeft

Temperature:22.0C

MGA Test Reference No.:U11320

Humidity:53.7%

Approach Horizontal Angles:270º

Time of Test:11:01:03 AM

Approach Vertical Angles:45º

FMH Serial No:[037]

Additional Description:2 relocations

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
682	683	5.1	18.8	13	0

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

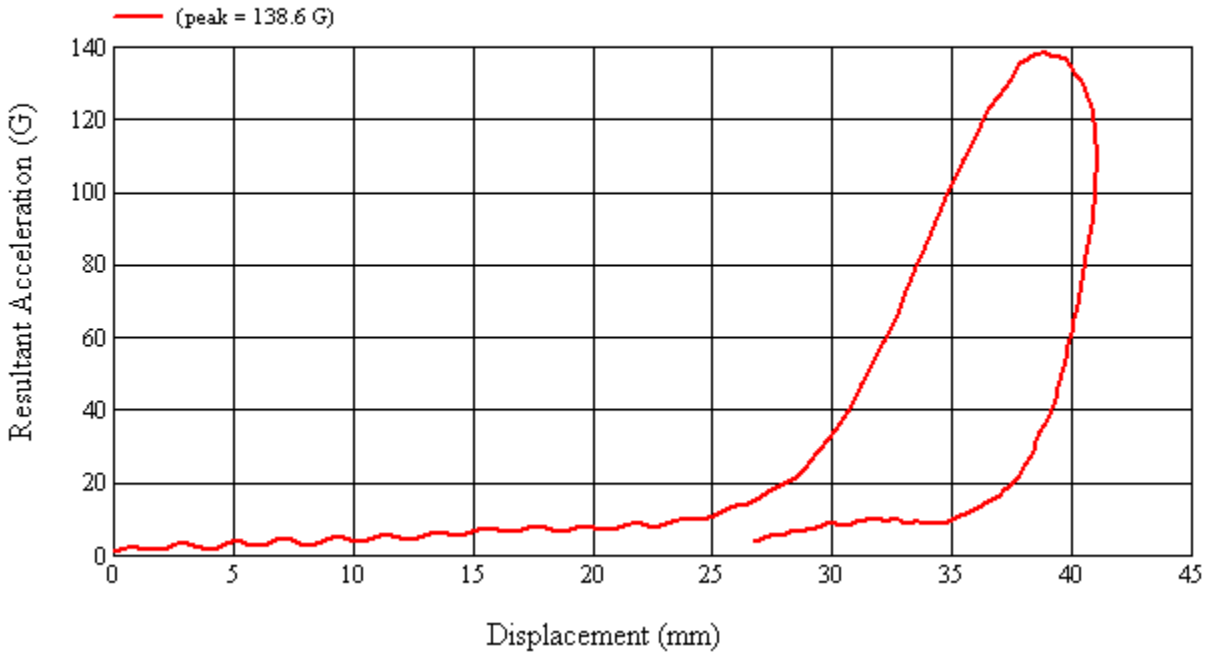
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

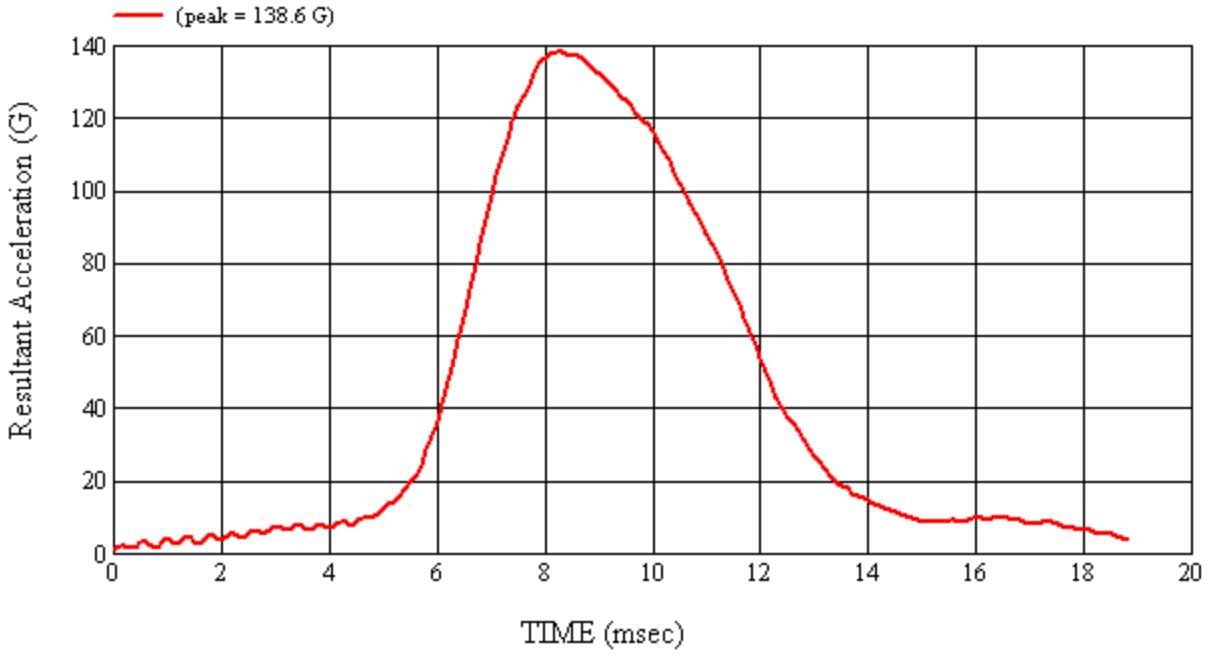
Headliner deformation

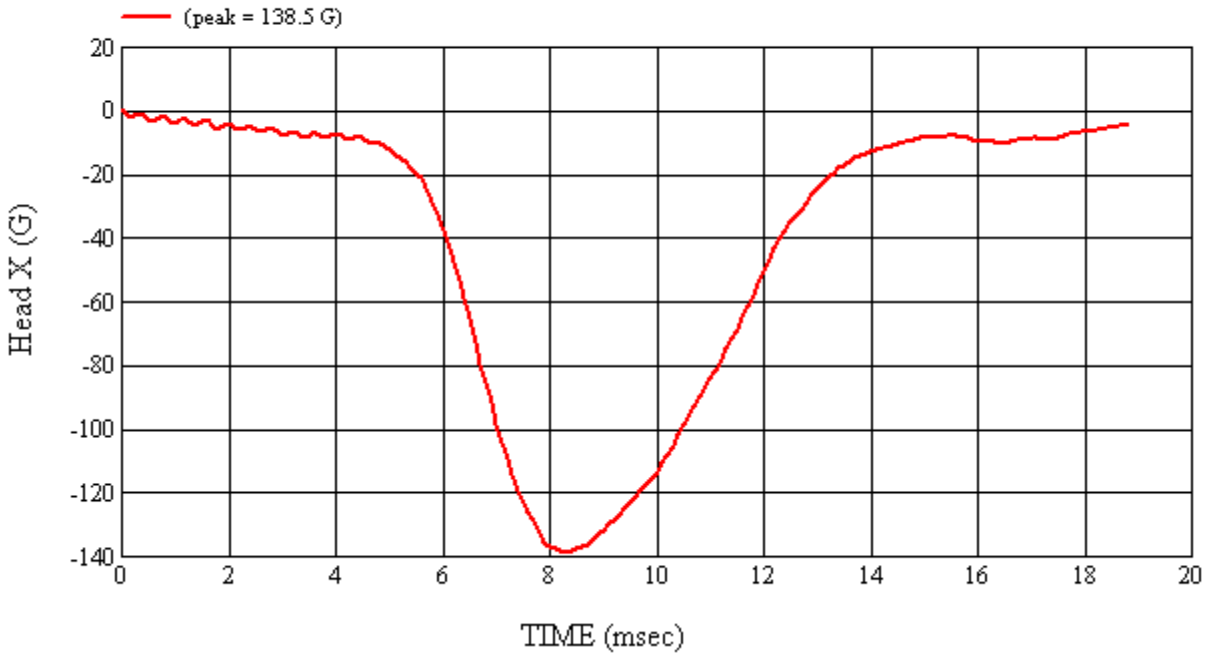
Recorded By: _____ Approved By*: _____ Date: 7/14/2011

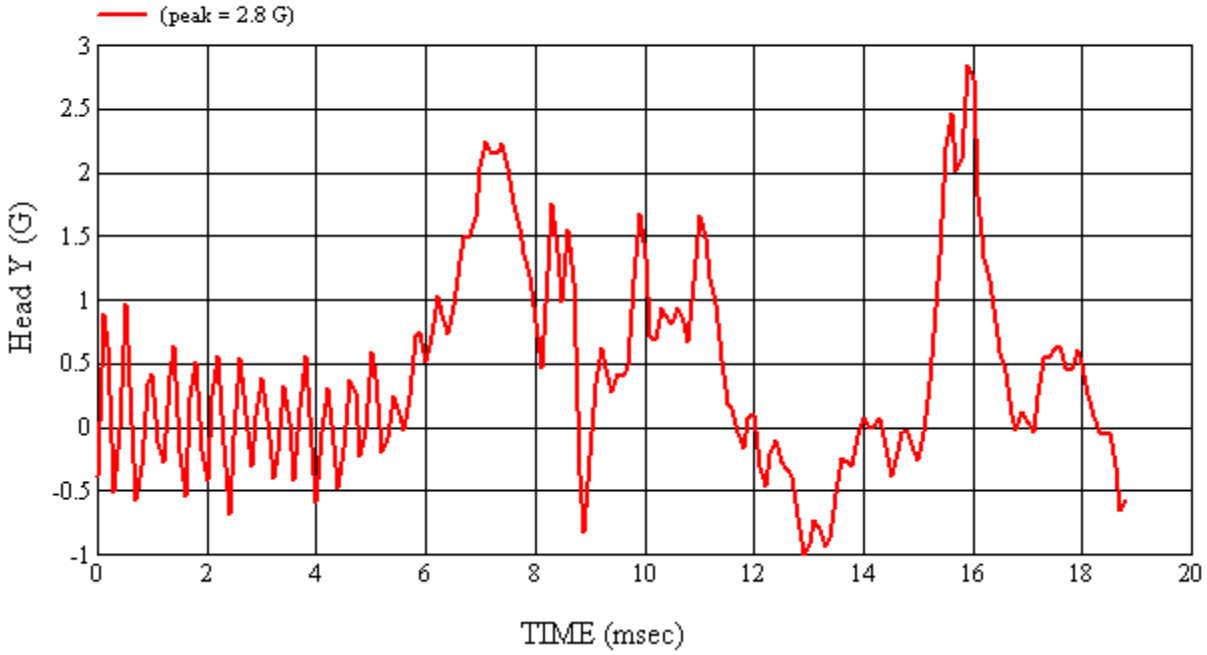
*Only necessary for NHTSA (Government) Compliance testing.

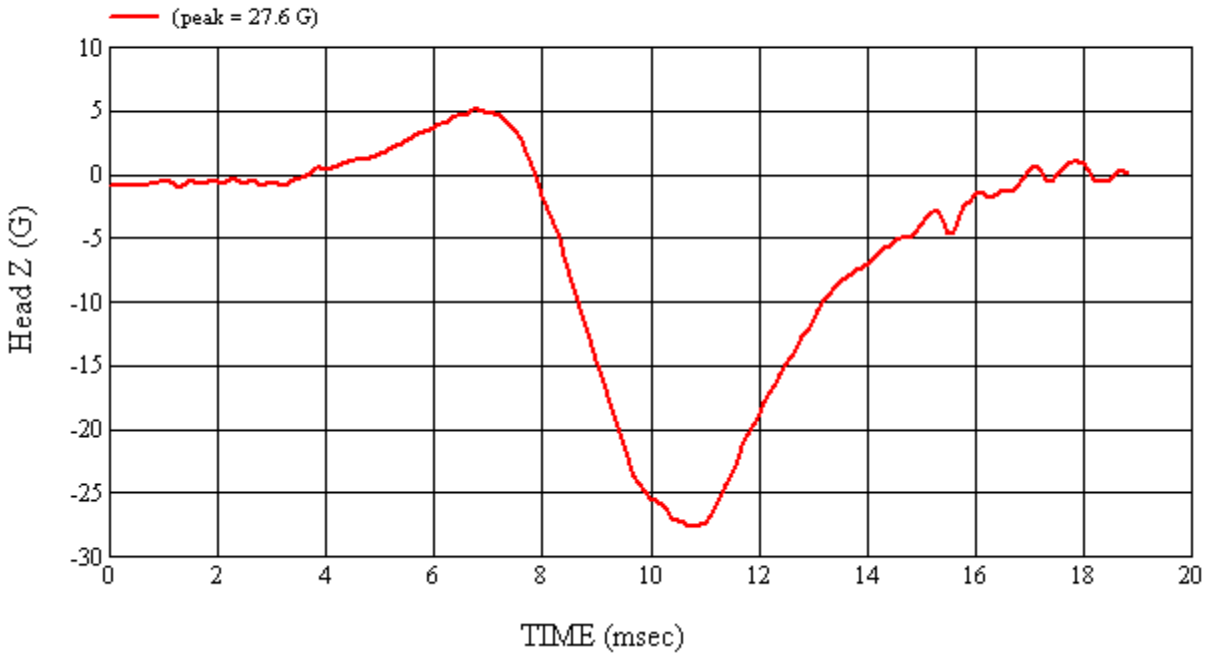
MGA Test #: U11320 Target Location: SR2B, Left Side Test Date: 7/14/2011

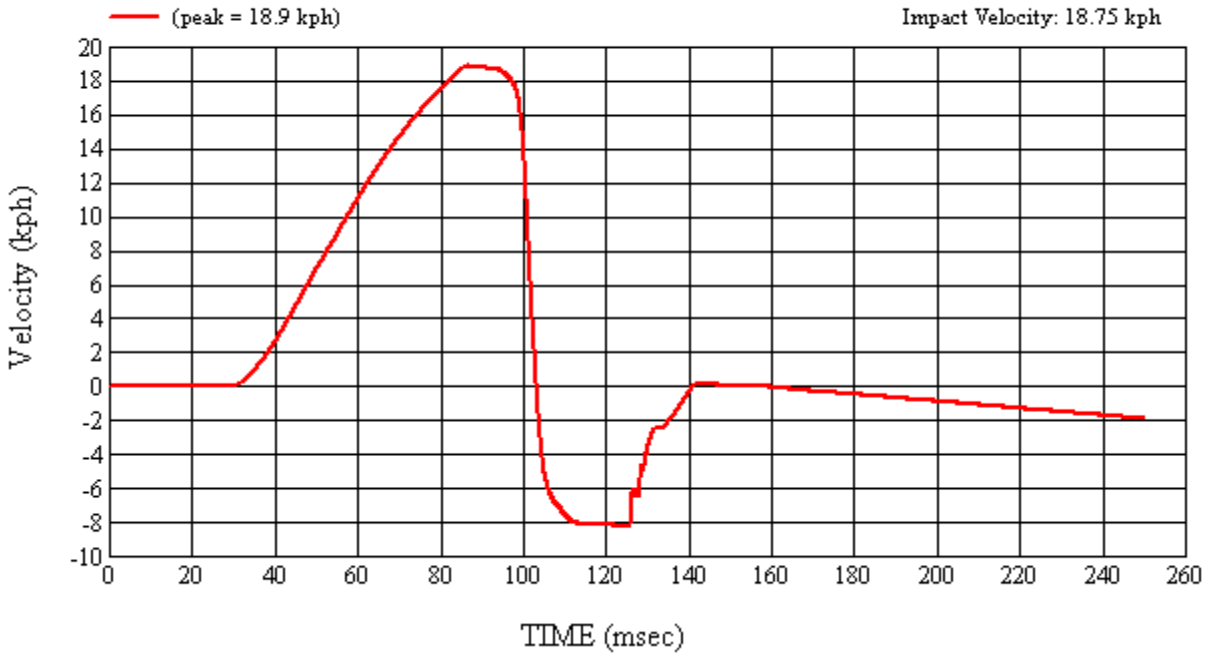


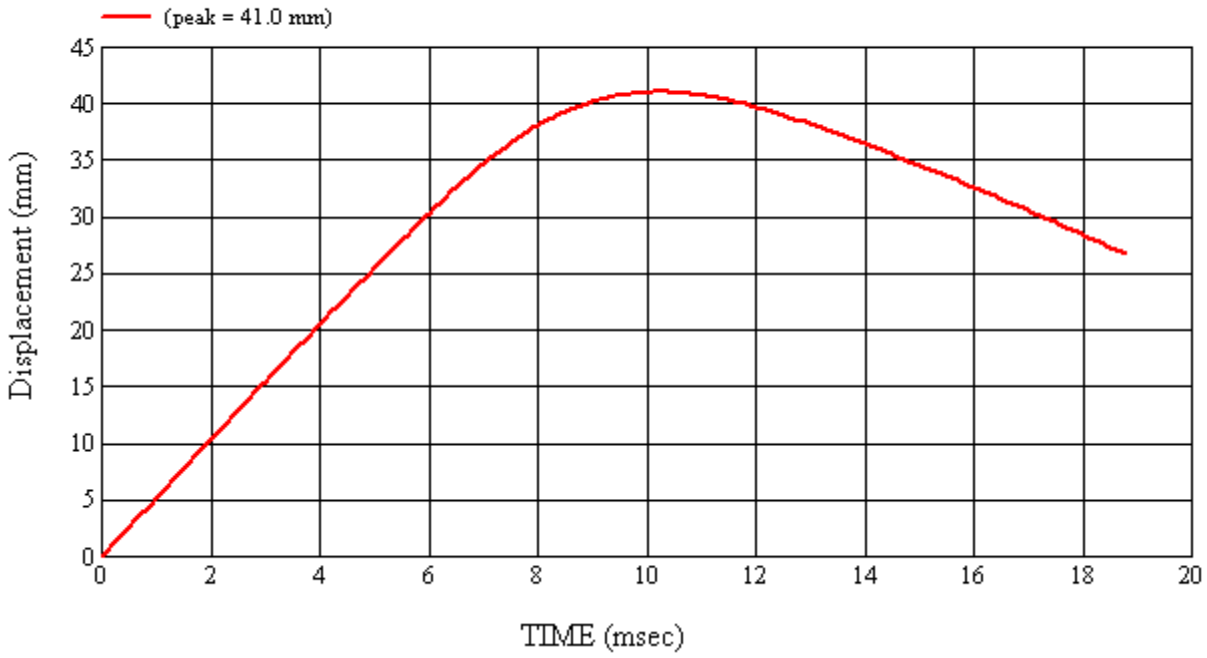



(peak = 138.5 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 2.8 G)
Head Y (G)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)

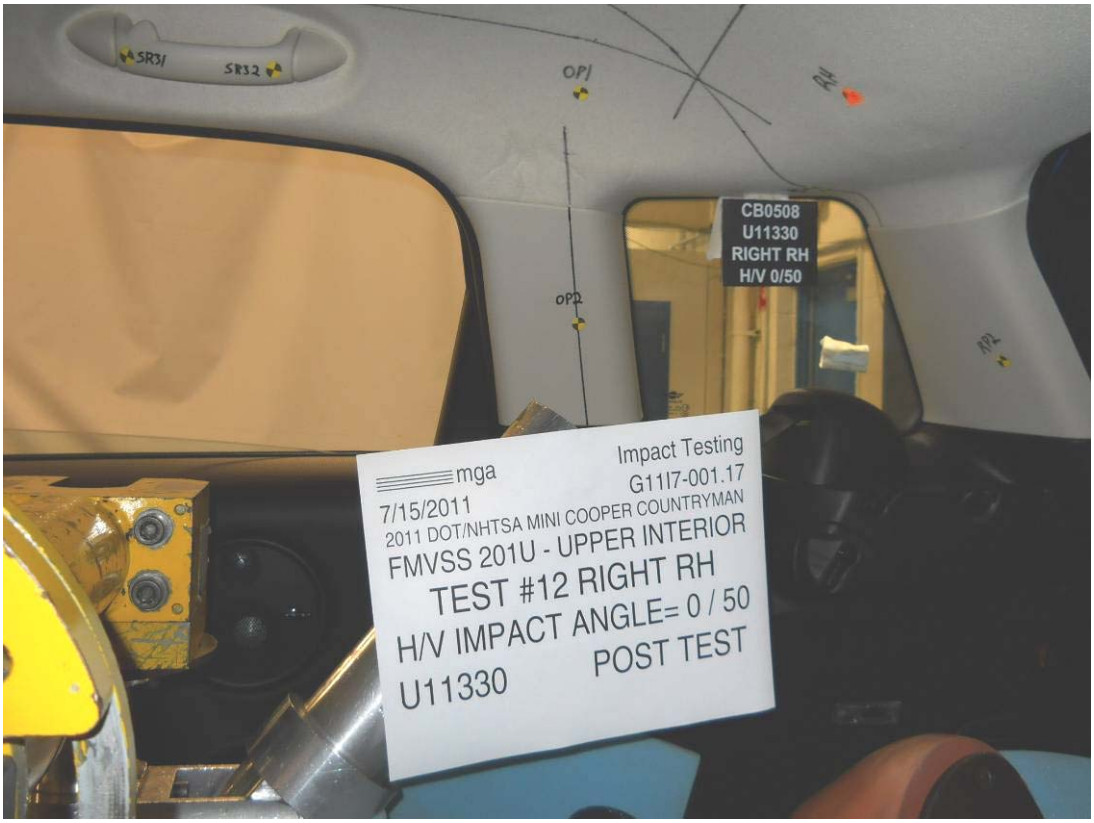

(peak = 27.6 G)
Head Z (G)
10
5
0
-5
-10
-15
-20
-25
-30
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 18.9 kph)
Impact Velocity: 18.75 kph
Velocity (kph)
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
TIME (msec)

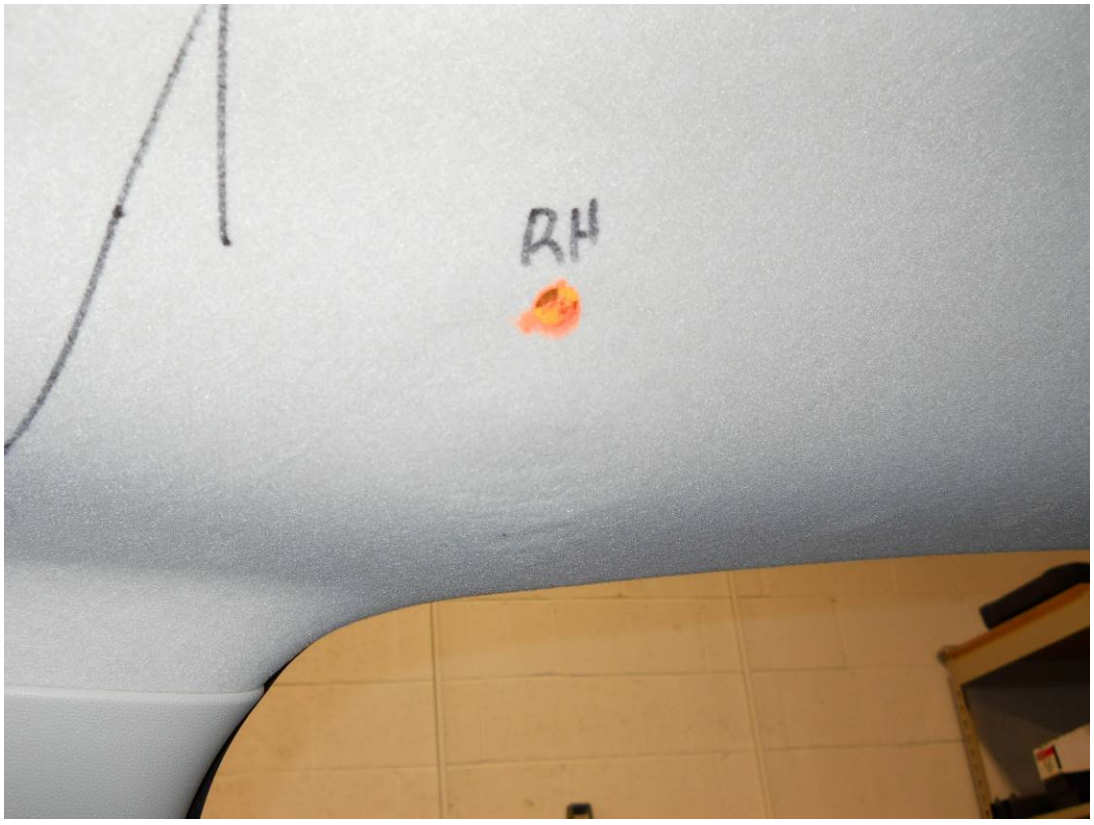

(peak = 41.0 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT RH
H/V IMPACT ANGLE= 0 / 50
U11330
PRE TEST


RH
mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT RH
H/V IMPACT ANGLE= 0 / 50
U11330
PRE TEST


SR31
SR32
OP1
RH
OP2
RP2
CB0508
U11330
RIGHT RH
H/V 0/50
mga
Impact Testing
G11I7-001.17
7/15/2011
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT RH
H/V IMPACT ANGLE= 0 / 50
U11330
POST TEST


RH
RP2
mga
Impact Testing
G11I7-001.17
7/15/2011
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT RH
H/V IMPACT ANGLE= 0 / 50
U11330
POST TEST


RH


mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #12 RIGHT RH
H/V IMPACT ANGLE= 0 / 50
U11330
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#12

Target (Vehicle Side): RHRight

Temperature:23.9C

MGA Test Reference No.:U11330

Humidity:50.1%

Approach Horizontal Angles:0º

Time of Test:4:50:52 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
808	850	5.8	23.6	6	5 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

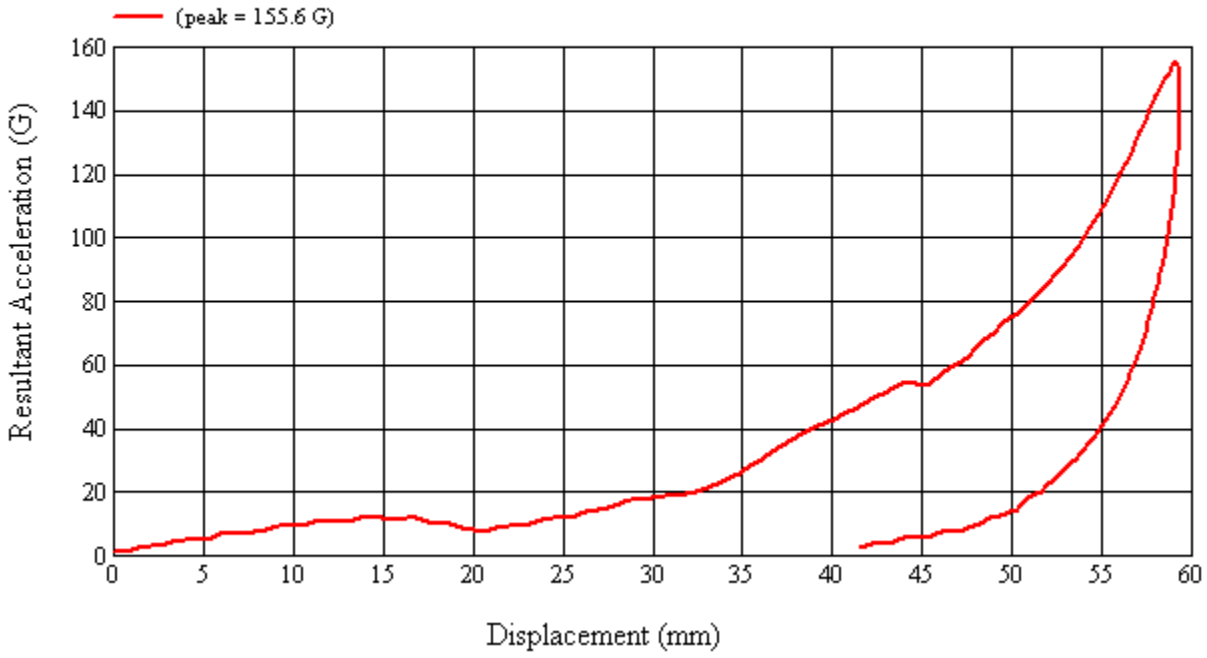
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

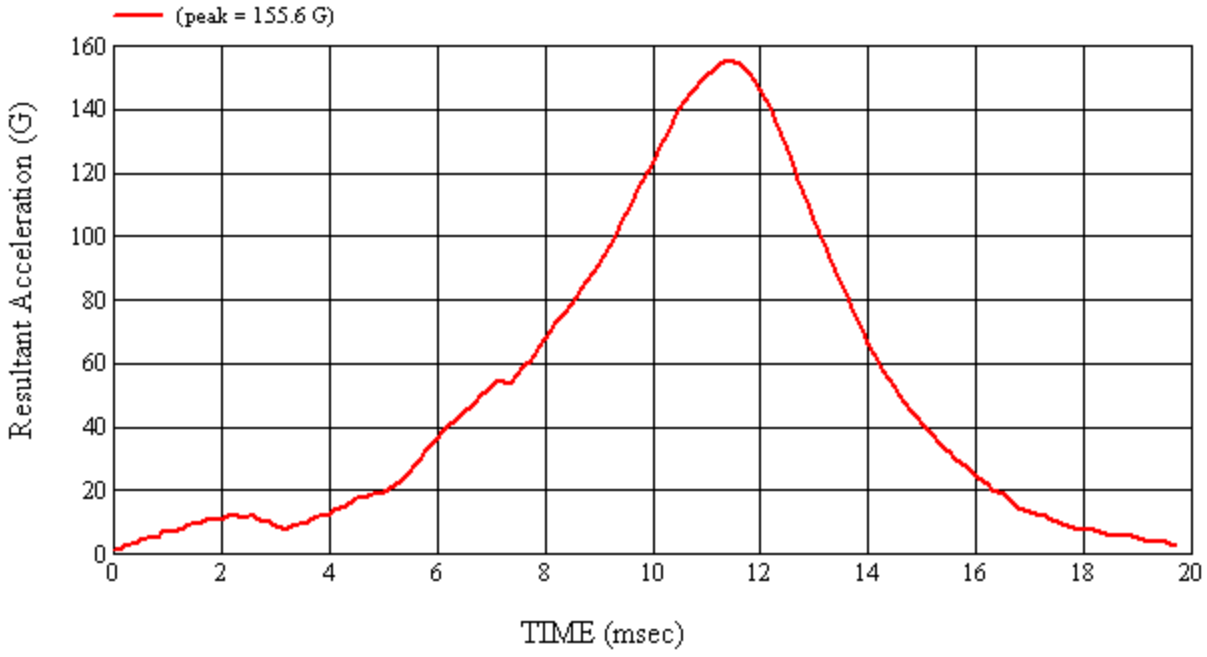
Headliner deformation

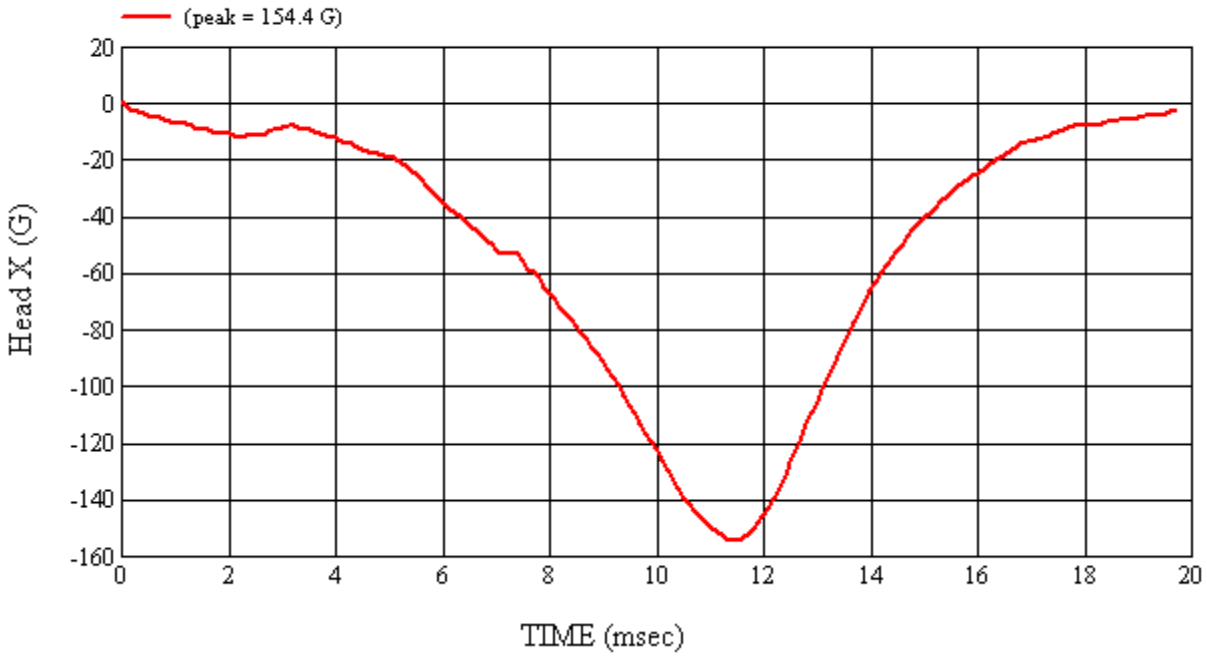
Recorded By: _____ Approved By*: _____ Date: 7/15/2011

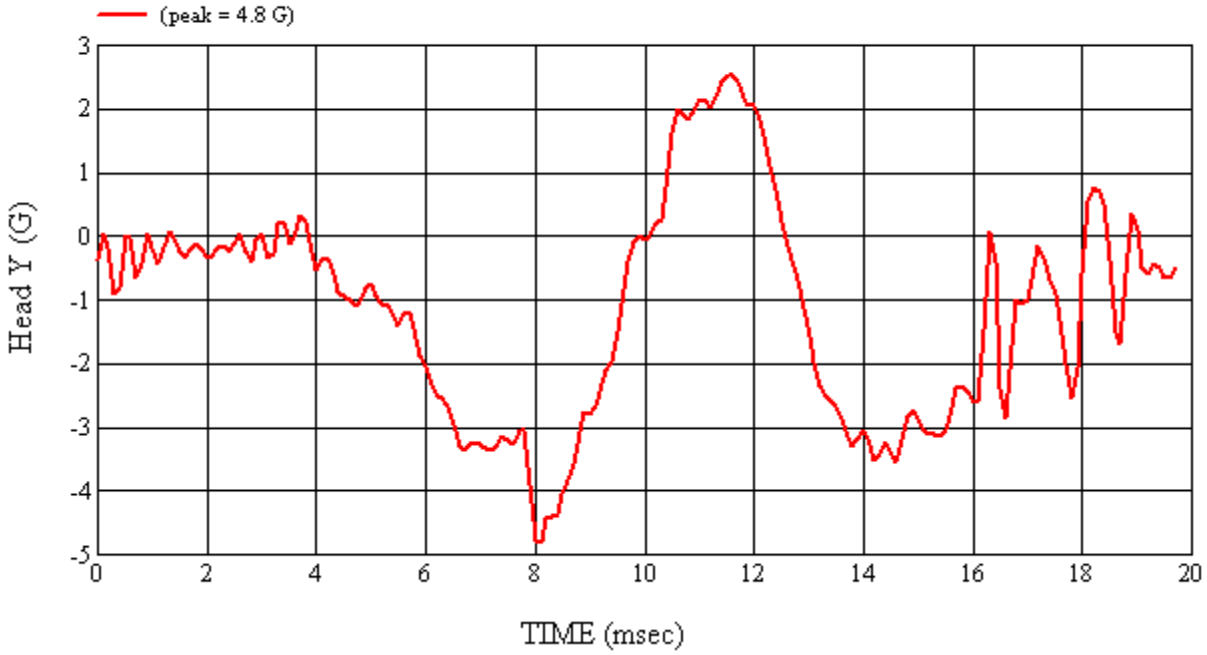
*Only necessary for NHTSA (Government) Compliance testing.

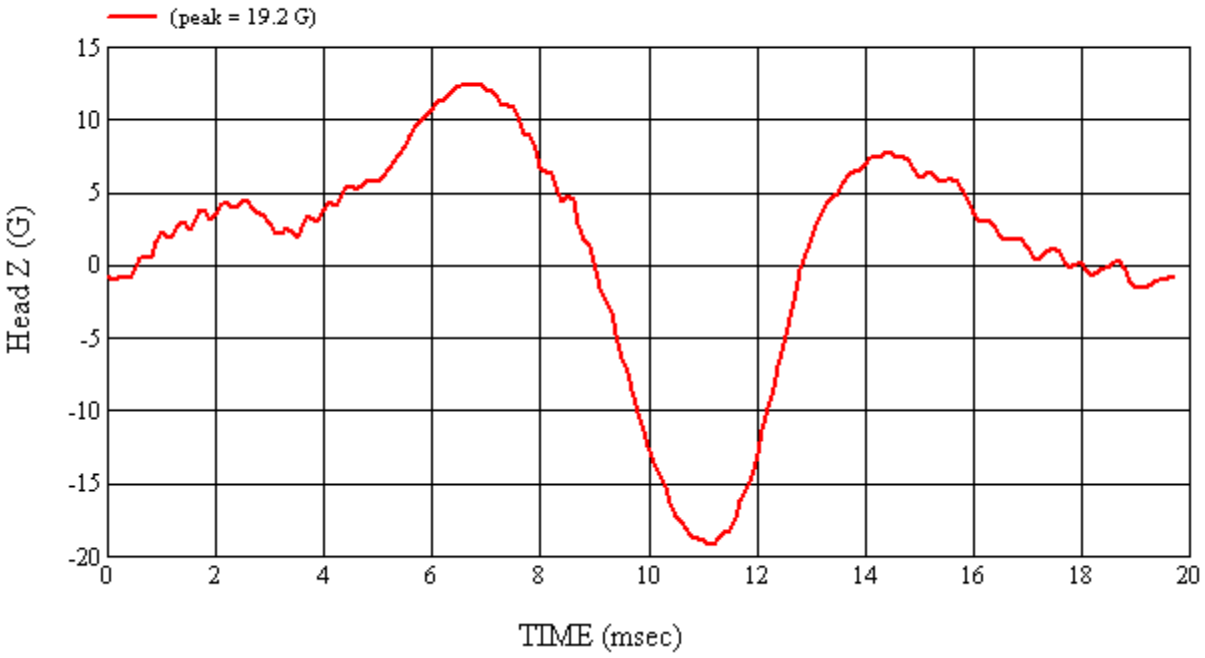
MGA Test #: U11330 Target Location: RH, Right Side Test Date: 7/15/2011

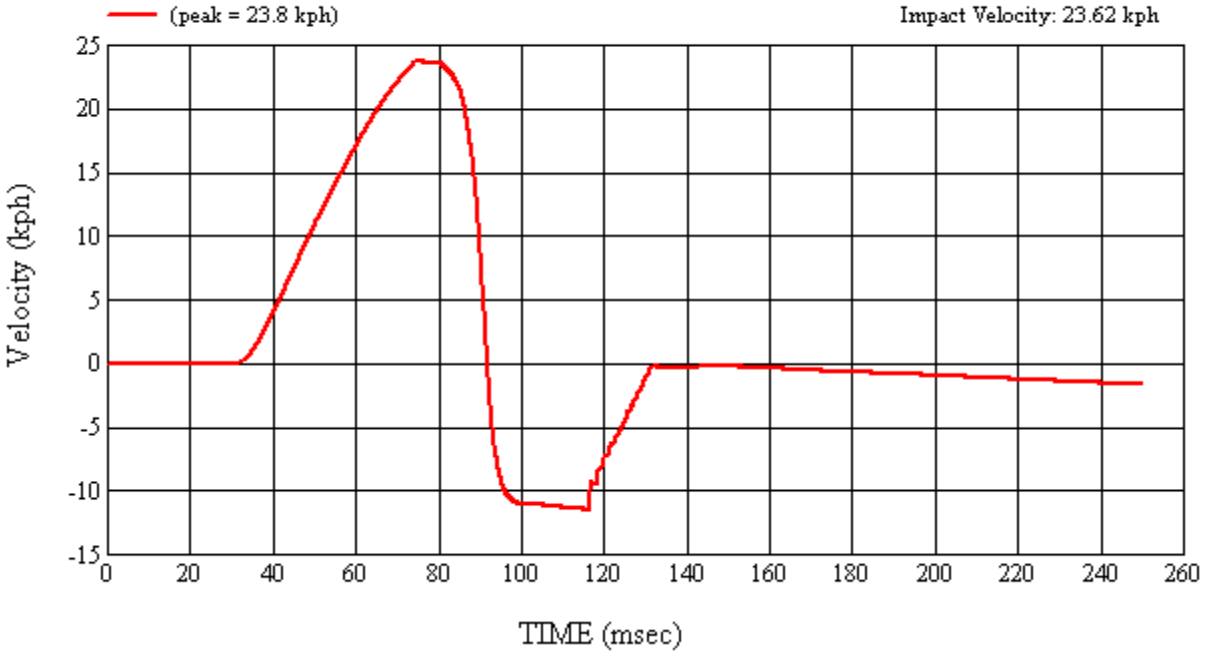


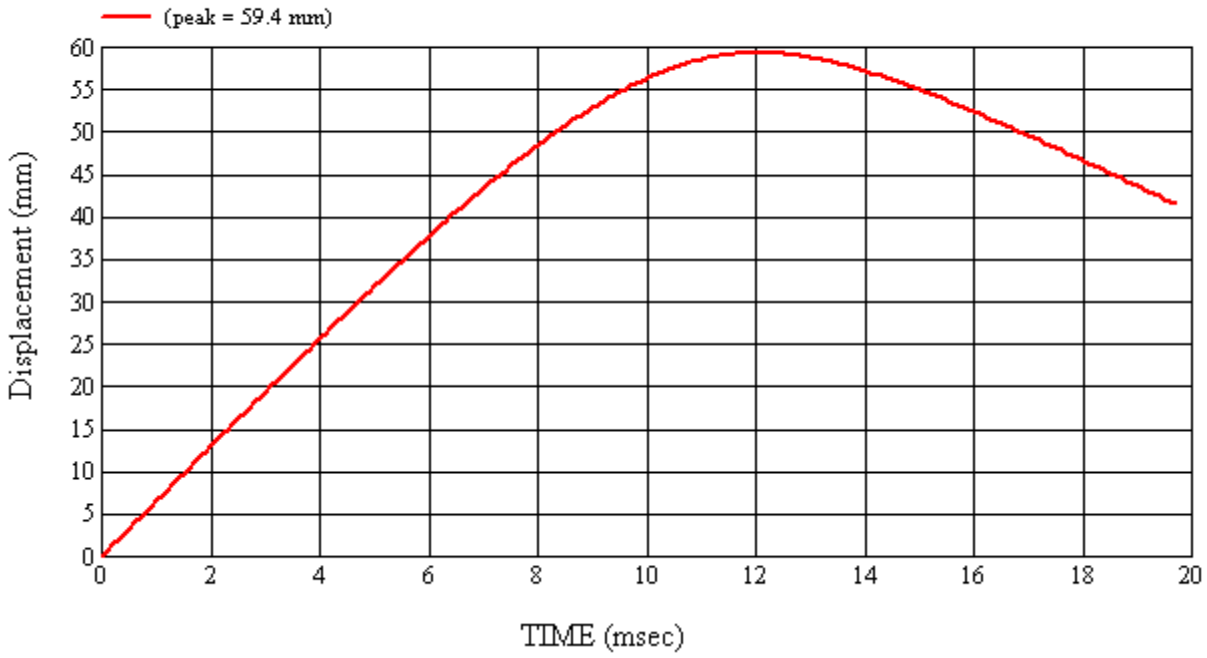



(peak = 154.4 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
-160
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


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


(peak = 19.2 G)
Head Z (G)
15
10
5
0
-5
-10
-15
-20
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 23.8 kph)
Impact Velocity: 23.62 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 = 59.4 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
TIME (msec)

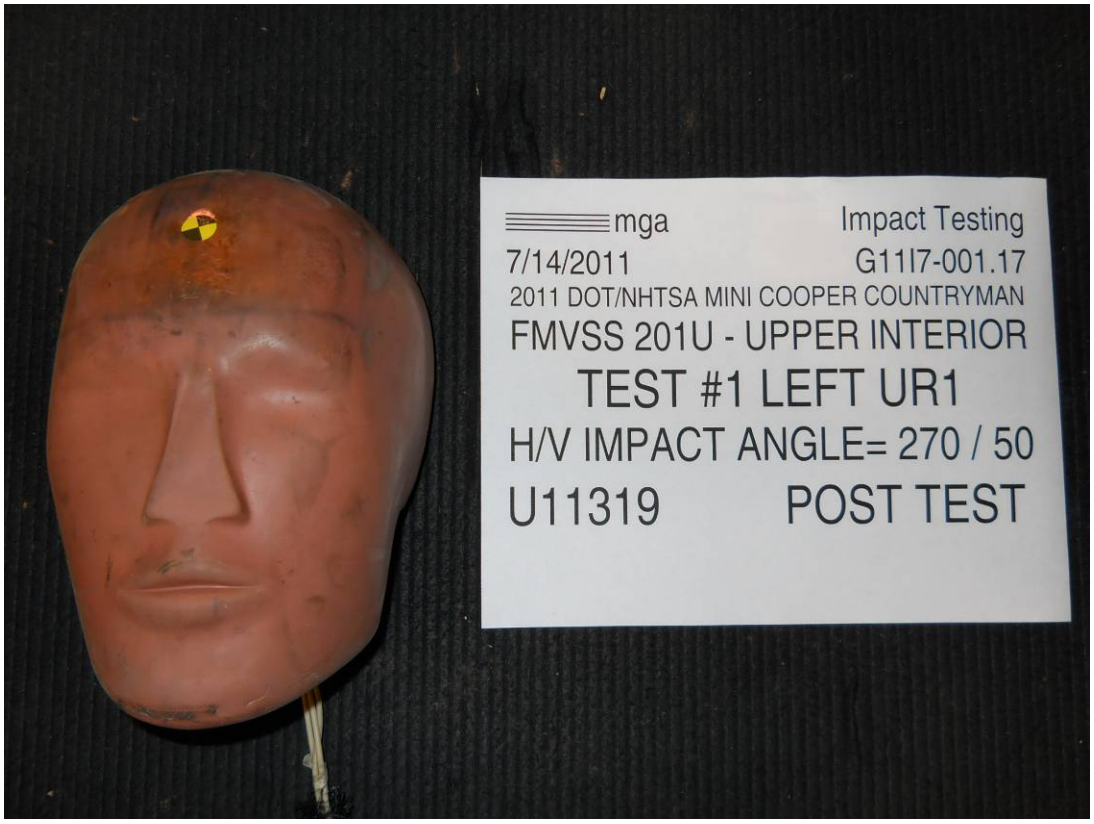

CB0508
U11319
LEFT UR1
H/V 270/50
mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
U11319
PRE TEST


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
U11319
PRE TEST
UR1
API


CB0508
U11319
LEFT UR1
H/V 270/50
mga
Impact Testing
G11I7-001.17
7/14/2011
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
U11319
POST TEST


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
U11319
POST TEST
CB0508
U11319
LEFT UR1
H/V 270/50


UR1
AP1
AP2


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #1 LEFT UR1
H/V IMPACT ANGLE= 270 / 50
U11319
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#1

Target (Vehicle Side): UR1Left

Temperature:22.1C

MGA Test Reference No.:U11319

Humidity:52.2%

Approach Horizontal Angles:270º

Time of Test:10:00:45 AM

Approach Vertical Angles:50º

FMH Serial No:[035]

Additional Description:@ AP

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
713	724	7	23.5	35	1 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

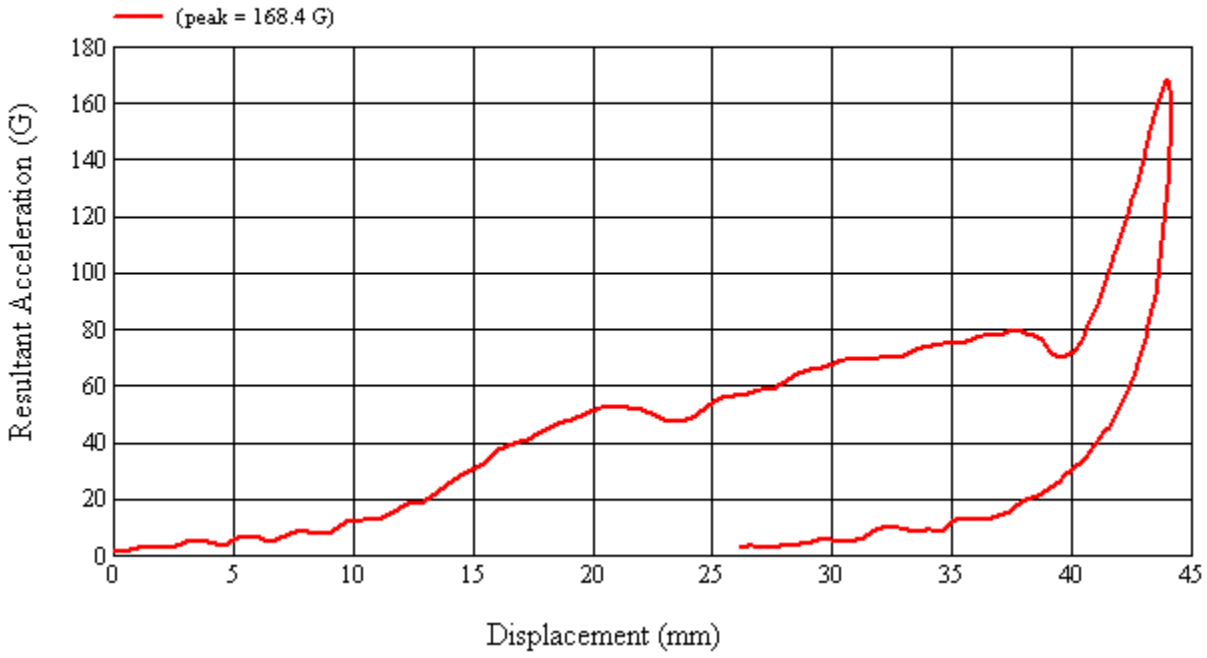
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

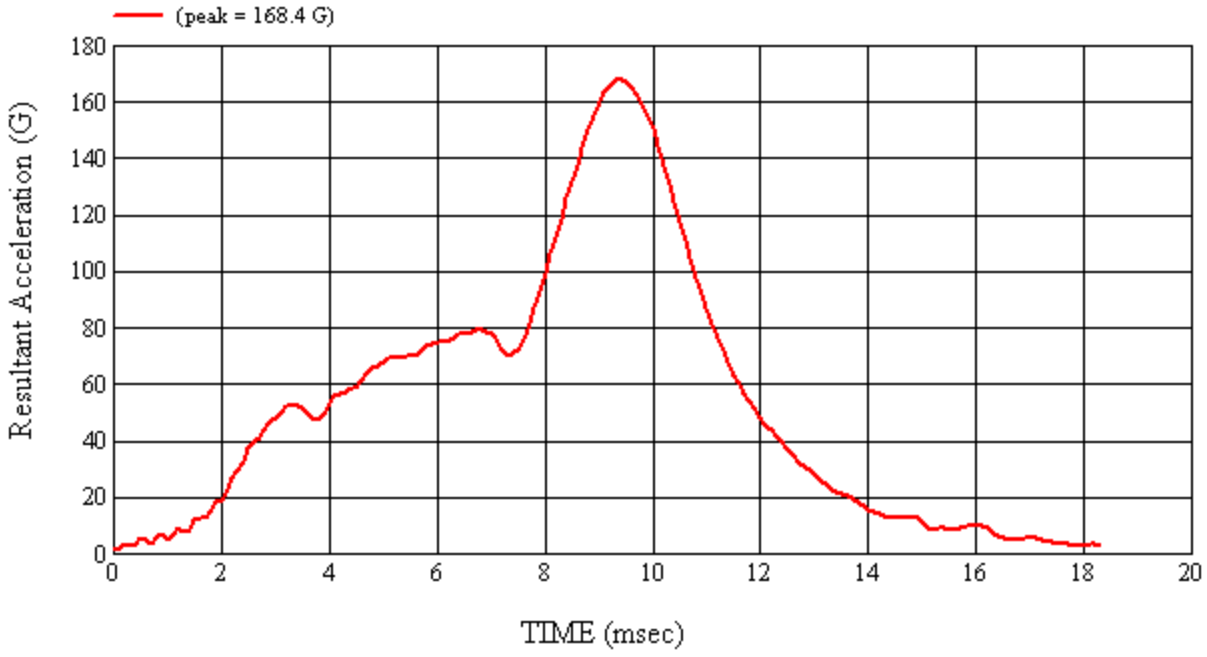
Dislodged headliner

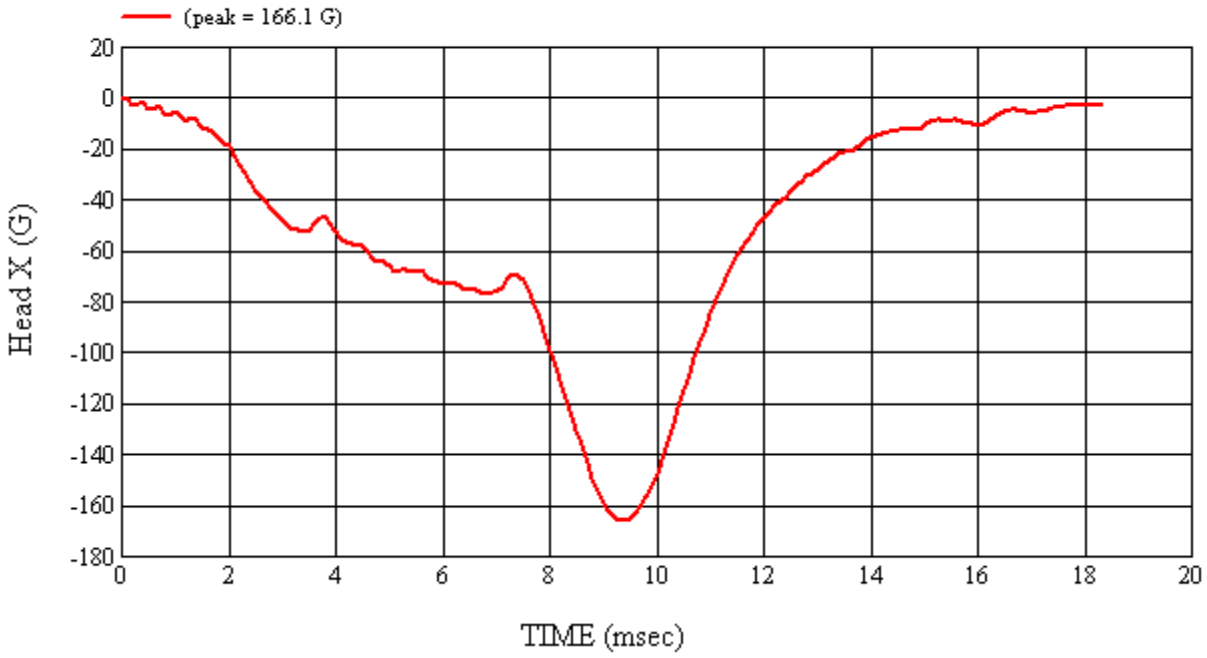
Recorded By: _____ Approved By*: _____ Date: 7/14/2011

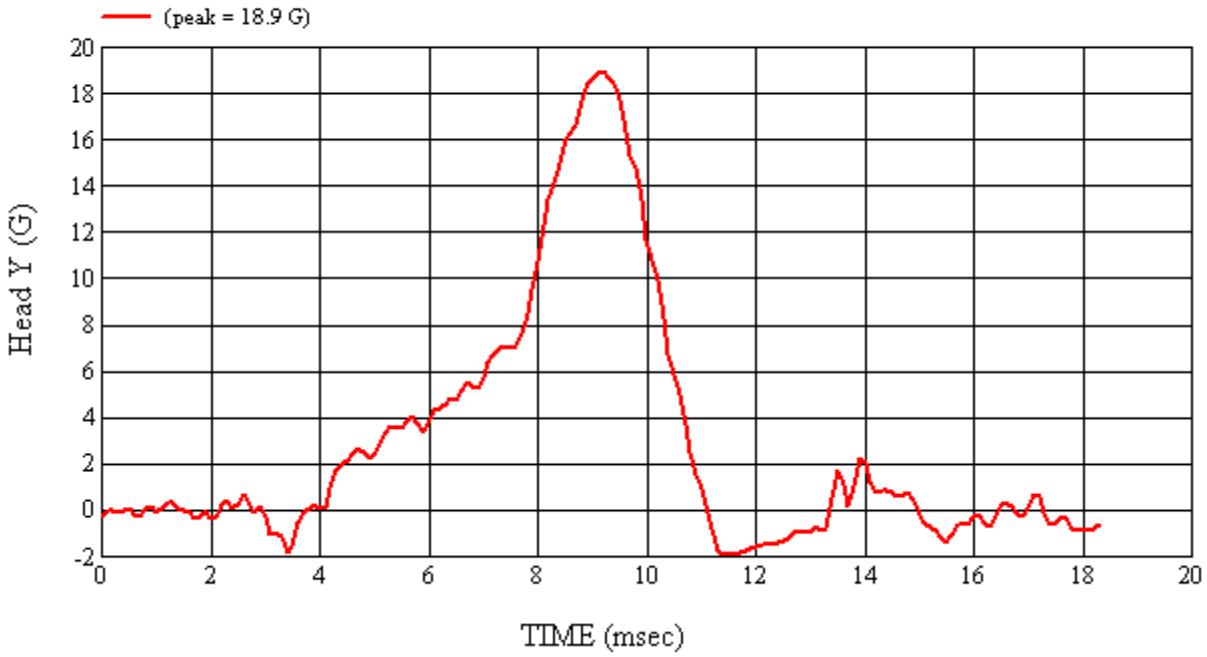
*Only necessary for NHTSA (Government) Compliance testing.

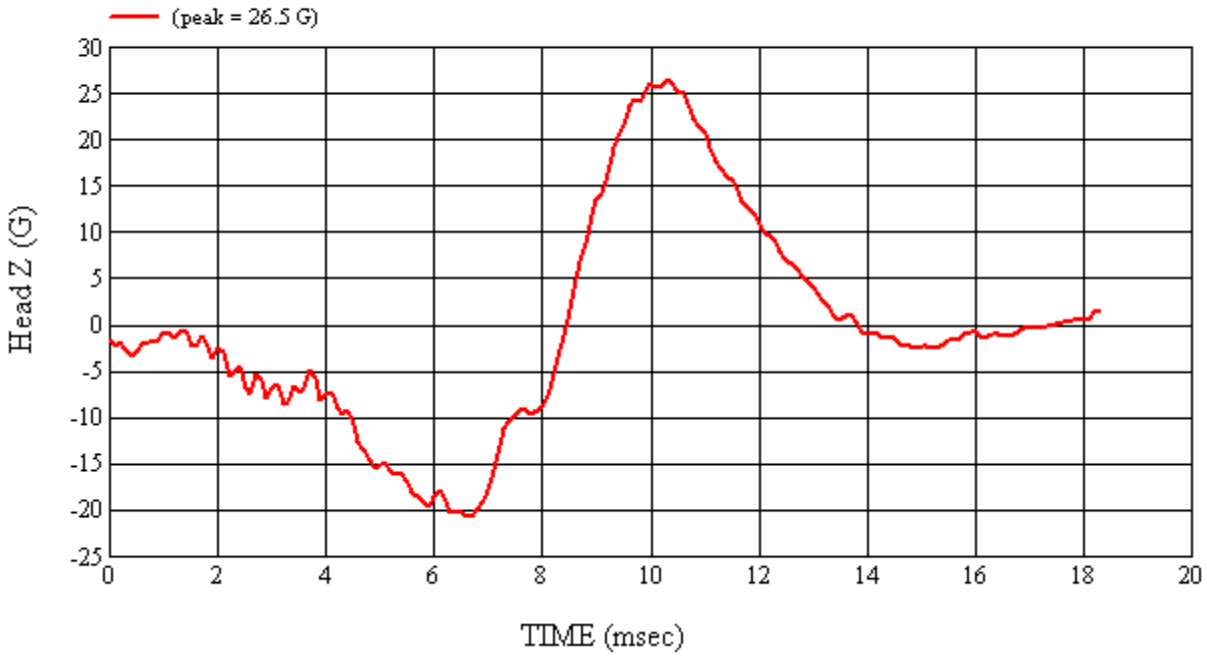
MGA Test #: U11319 Target Location: UR1, Left Side Test Date: 7/14/2011

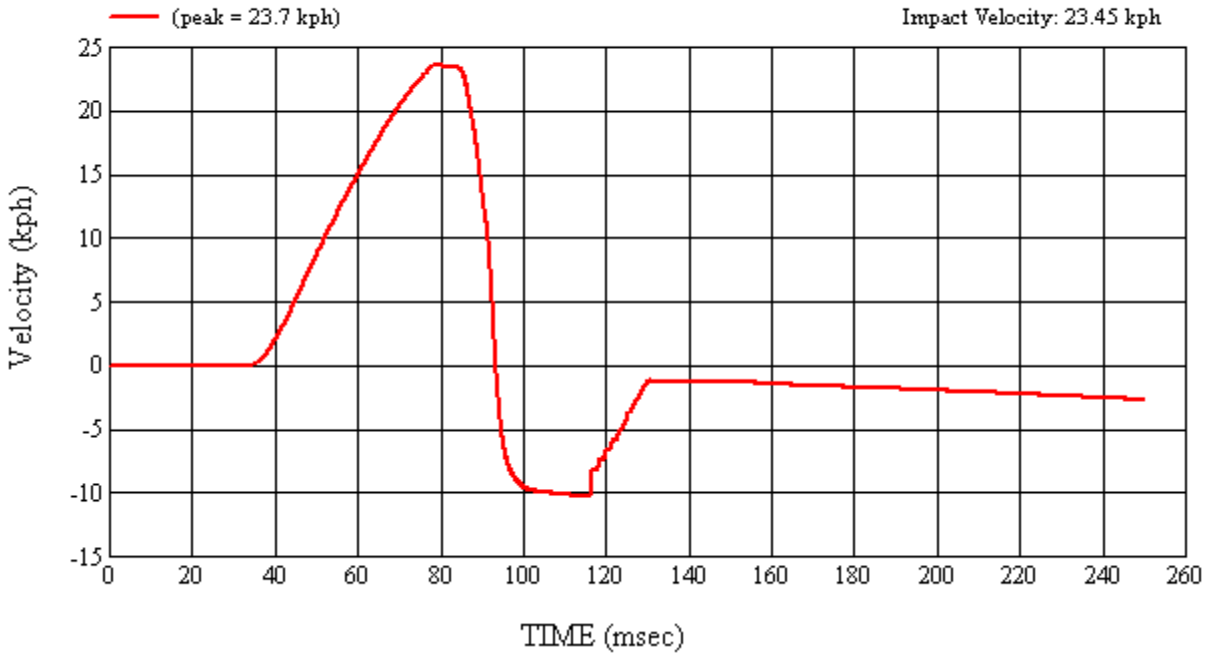


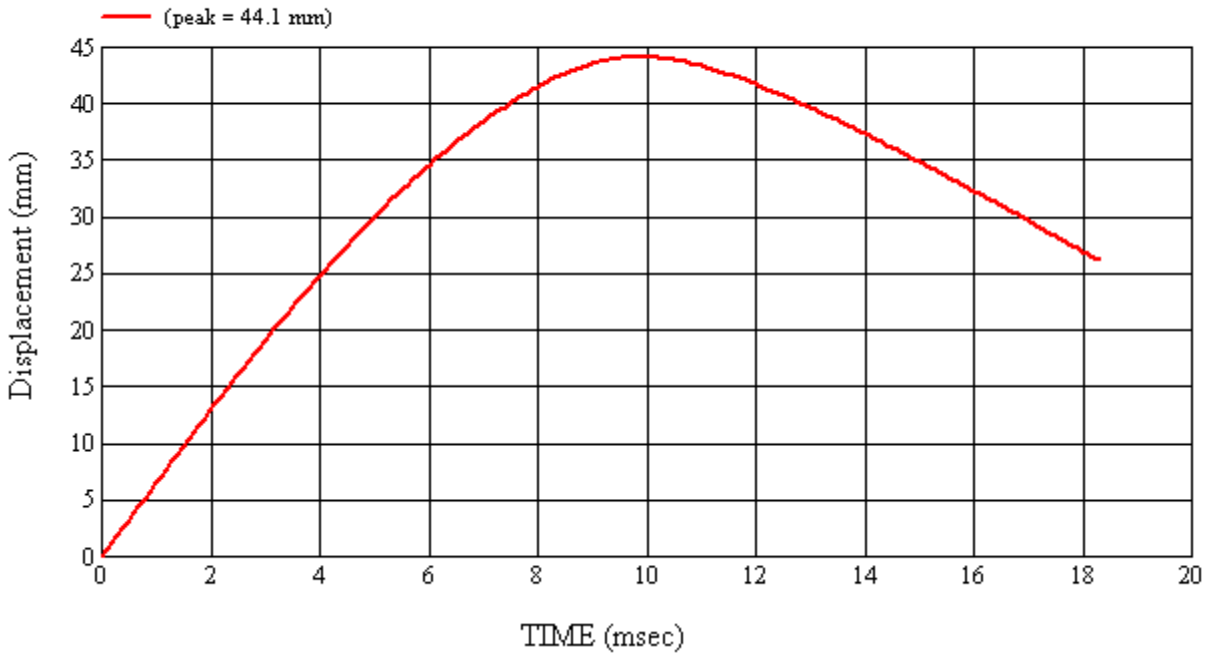



(peak = 166.1 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)

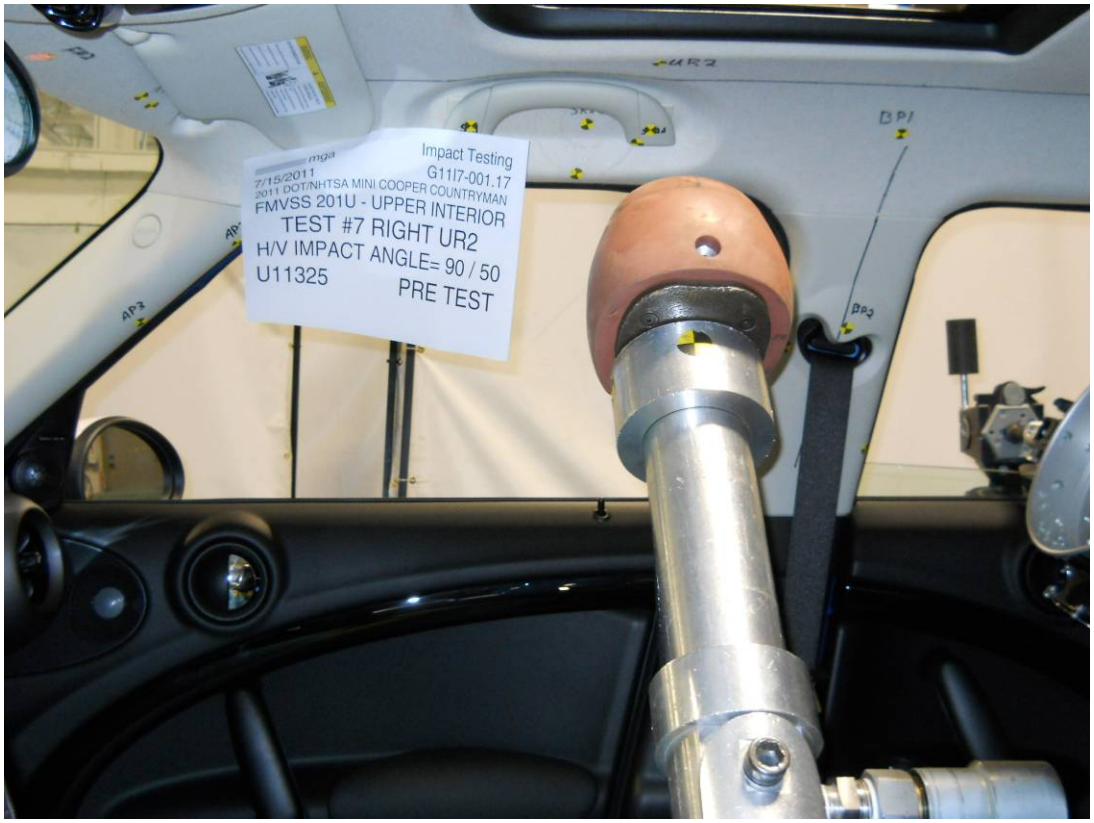

(peak = 18.9 G)
Head Y (G)
20
18
16
14
12
10
8
6
4
2
0
-2
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 26.5 G)
Head Z (G)
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 23.7 kph)
Impact Velocity: 23.45 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 = 44.1 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
45
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT UR2
H/V IMPACT ANGLE= 90 / 50
U11325
PRE TEST


Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT UR2
H/V IMPACT ANGLE= 90 / 50
U11325
PRE TEST


CB0508
U11325
RIGHT UR2
H/V 90/50
mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT UR2
H/V IMPACT ANGLE= 90 / 50
U11325
POST TEST


mga
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT UR2
H/V IMPACT ANGLE= 90 / 50
U11325
POST TEST


SR2D
UR2


mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #7 RIGHT UR2
H/V IMPACT ANGLE= 90 / 50
U11325
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#7

Target (Vehicle Side): UR2Right

Temperature:21.7C

MGA Test Reference No.:U11325

Humidity:64.0%

Approach Horizontal Angles:90º

Time of Test:9:45:34 AM

Approach Vertical Angles:50º

FMH Serial No:[035]

Additional Description:@ SR2A

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
761	788	8.1	23.6	32	3 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

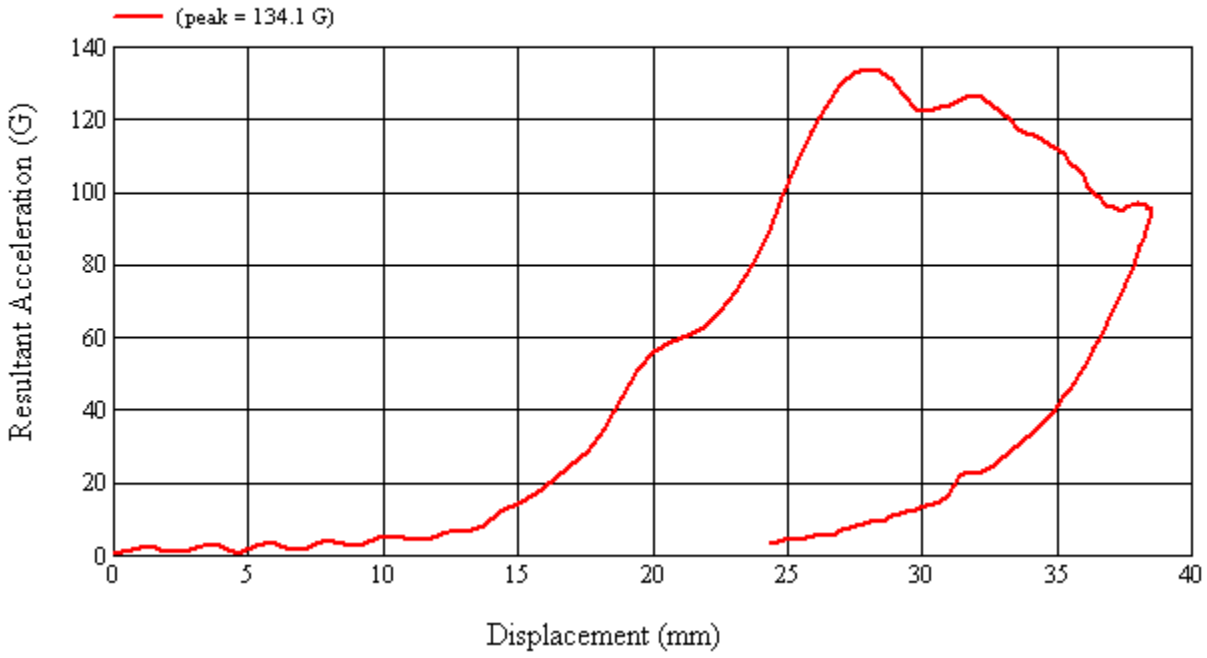
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

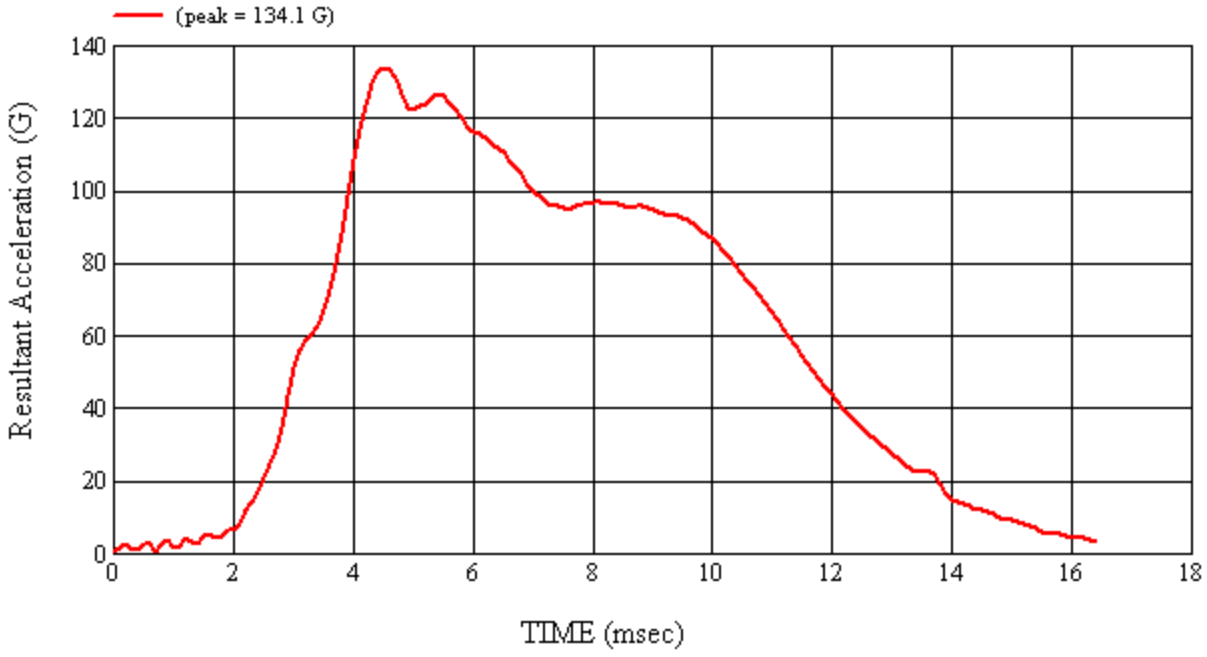
Headliner deformation, grab handle compression

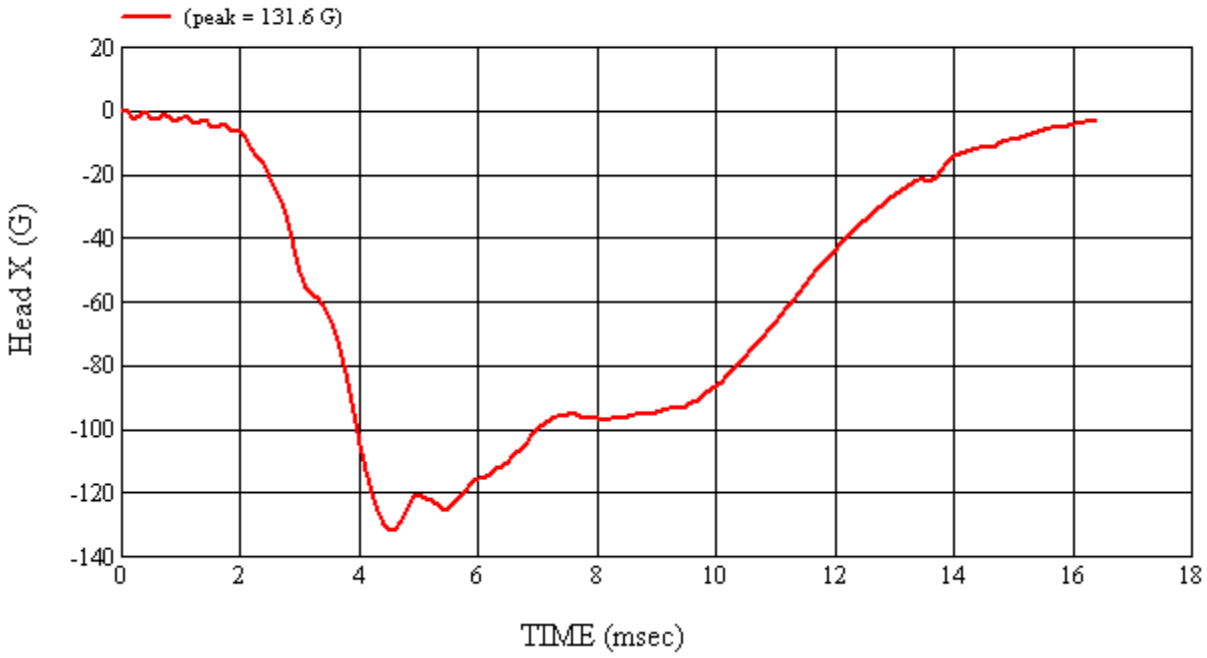
Recorded By: _____ Approved By*: _____ Date: 7/15/2011

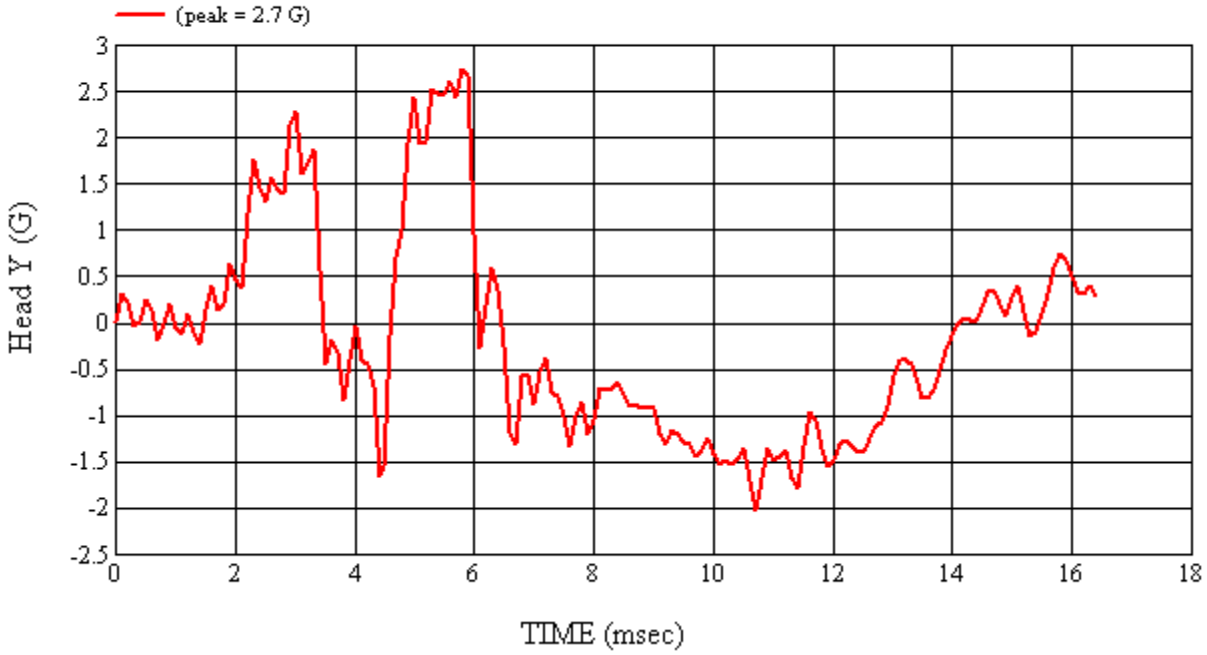
*Only necessary for NHTSA (Government) Compliance testing.

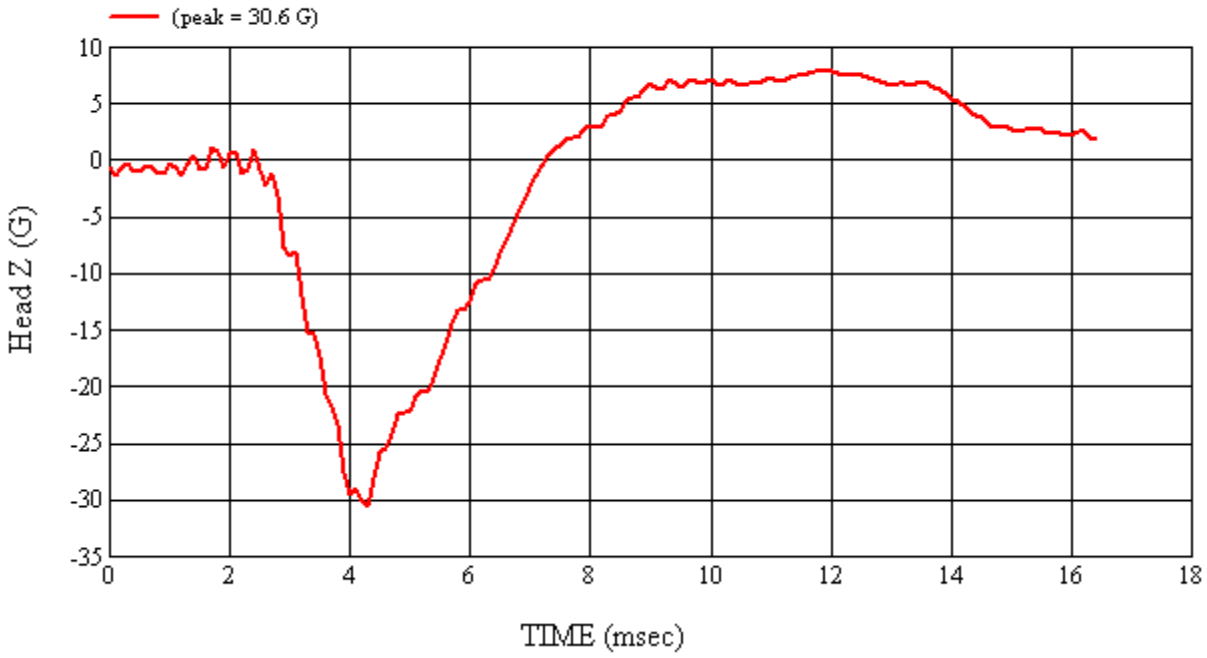
MGA Test #: U11325 Target Location: UR2, Right Side Test Date: 7/15/2011

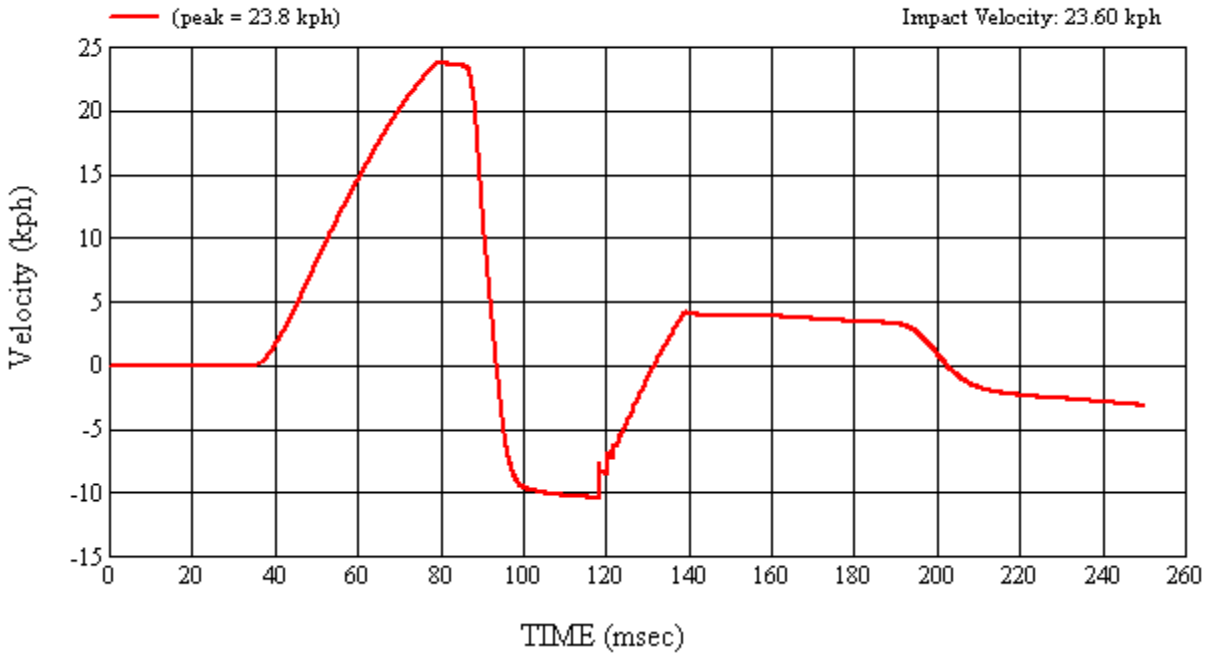


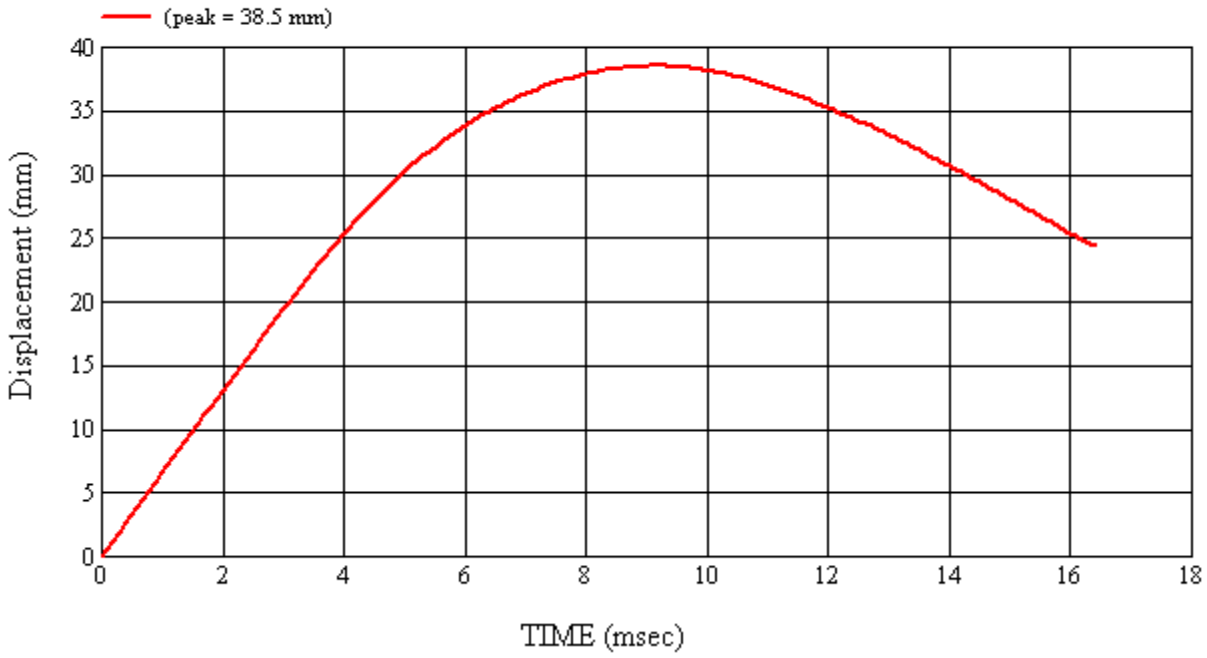


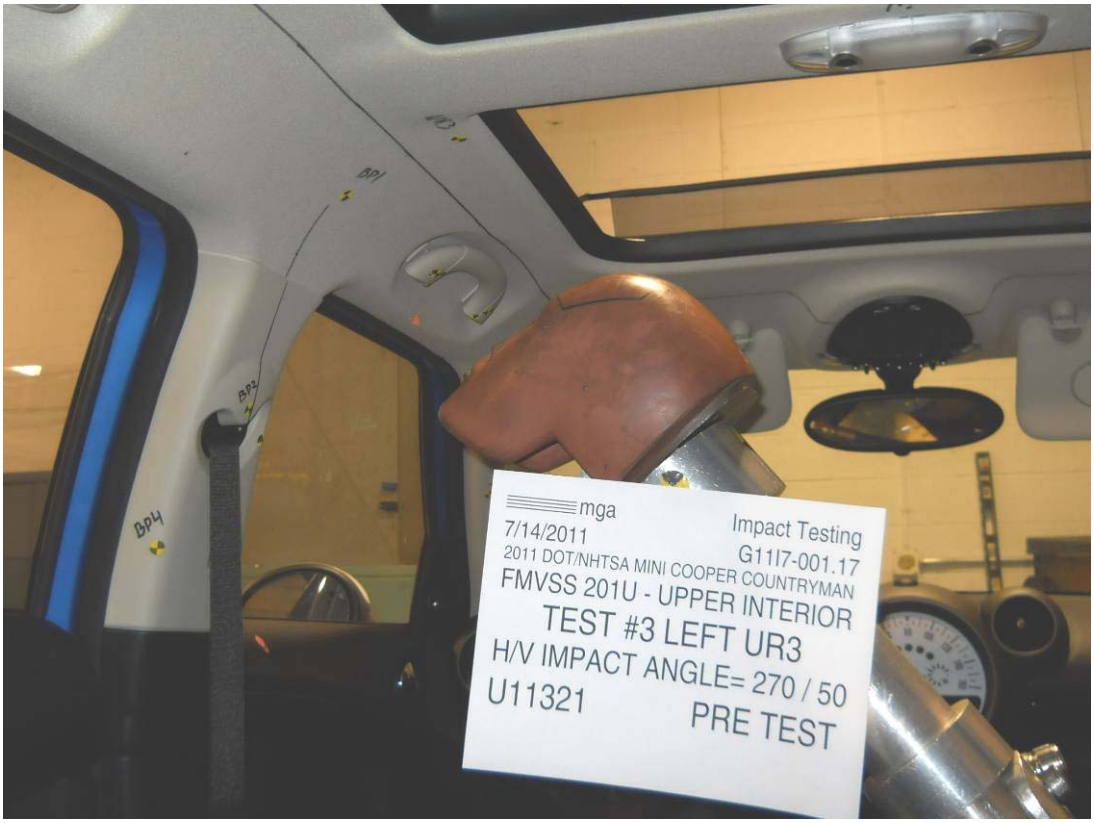

(peak = 131.6 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 2.7 G)
Head Y (G)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 30.6 G)
Head Z (G)
10
5
0
-5
-10
-15
-20
-25
-30
-35
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 23.8 kph)
Impact Velocity: 23.60 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)

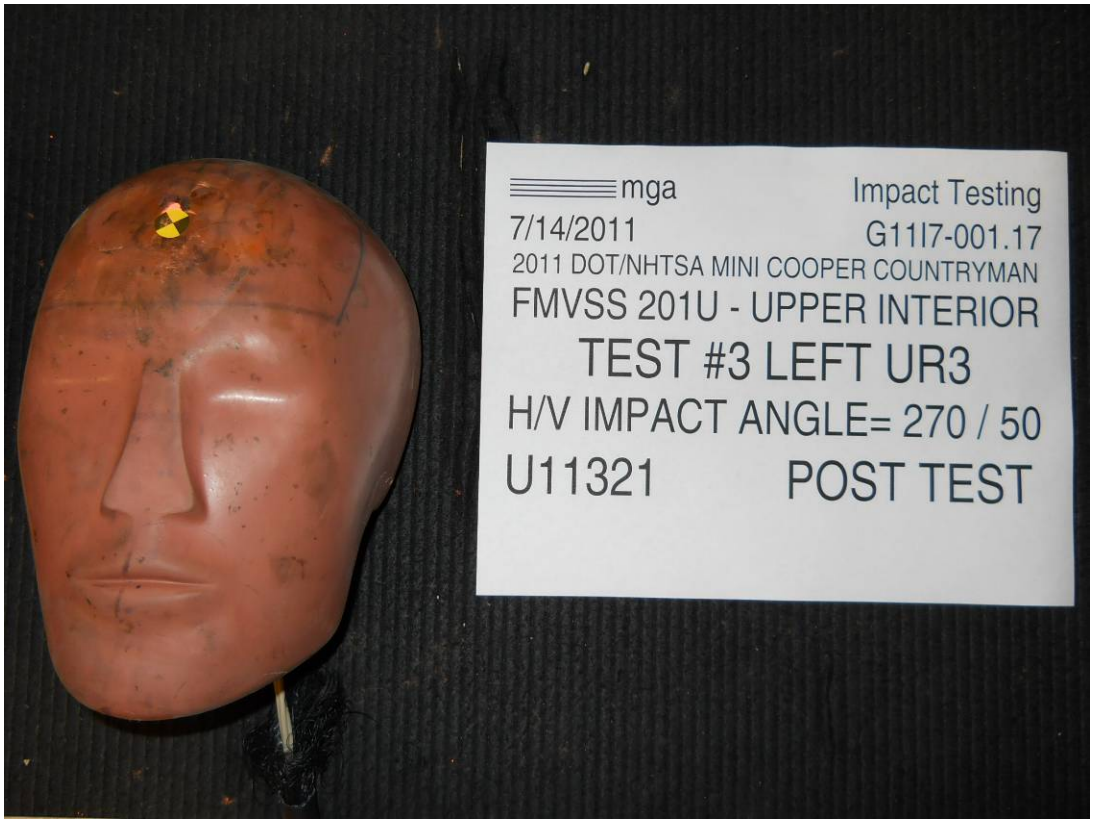

(peak = 38.5 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
0
2
4
6
8
10
12
14
16
18
TIME (msec)


mga
7/14/2011
Impact Testing
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT UR3
H/V IMPACT ANGLE= 270 / 50
U11321
PRE TEST


mga
7/14/2011
Impact Testing
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT UR3
H/V IMPACT ANGLE= 270 / 50
U11321
PRE TEST


mga
Impact Testing
G11I7-001.17
7/14/2011
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT UR3
H/V IMPACT ANGLE= 270 / 50
U11321
POST TEST


mga
Impact Testing
G11I7-001.17
7/14/2011
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT UR3
H/V IMPACT ANGLE= 270 / 50
U11321
POST TEST


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #3 LEFT UR3
H/V IMPACT ANGLE= 270 / 50
U11321
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#3

Target (Vehicle Side): UR3Left

Temperature:21.9C

MGA Test Reference No.:U11321

Humidity:54.8%

Approach Horizontal Angles:270º

Time of Test:11:50:50 AM

Approach Vertical Angles:50º

FMH Serial No:[038]

Additional Description:@ BP

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
566	529	9.8	23.6	34	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

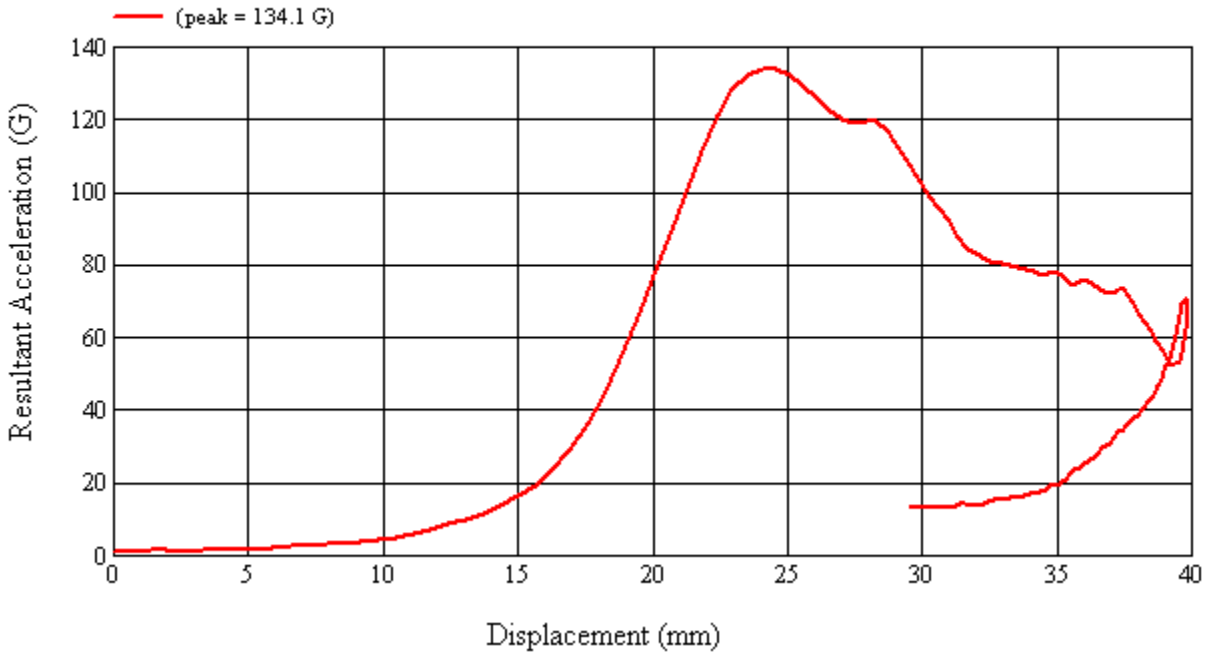
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

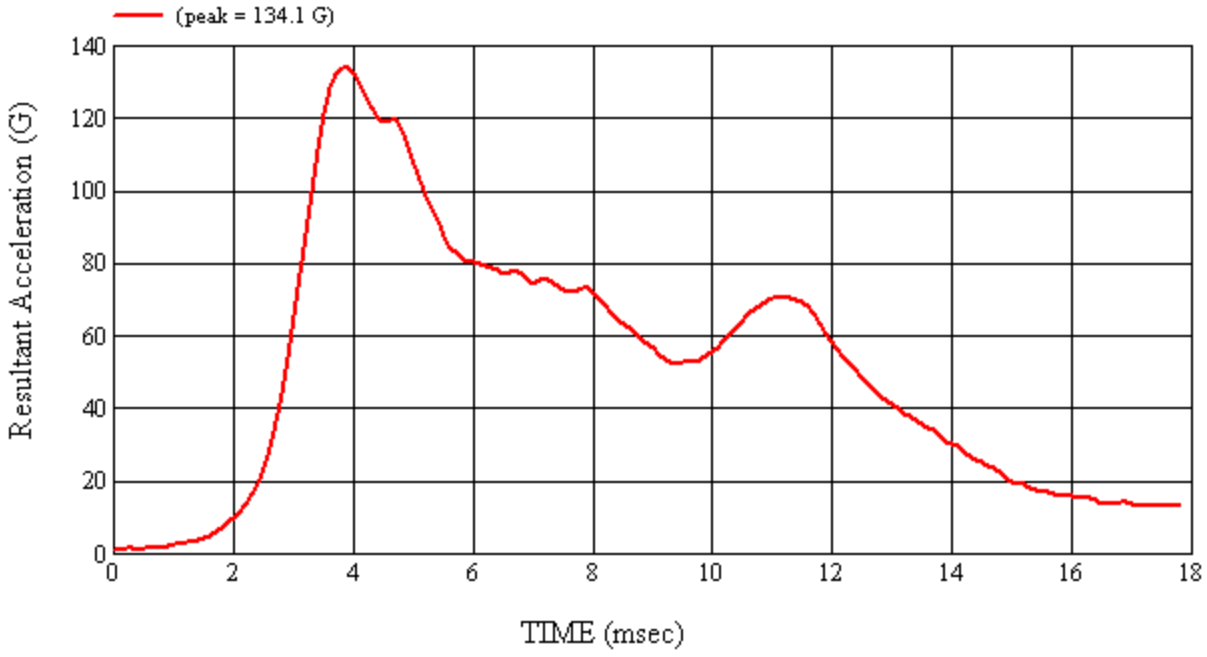
Headliner deformation, dislodged trim

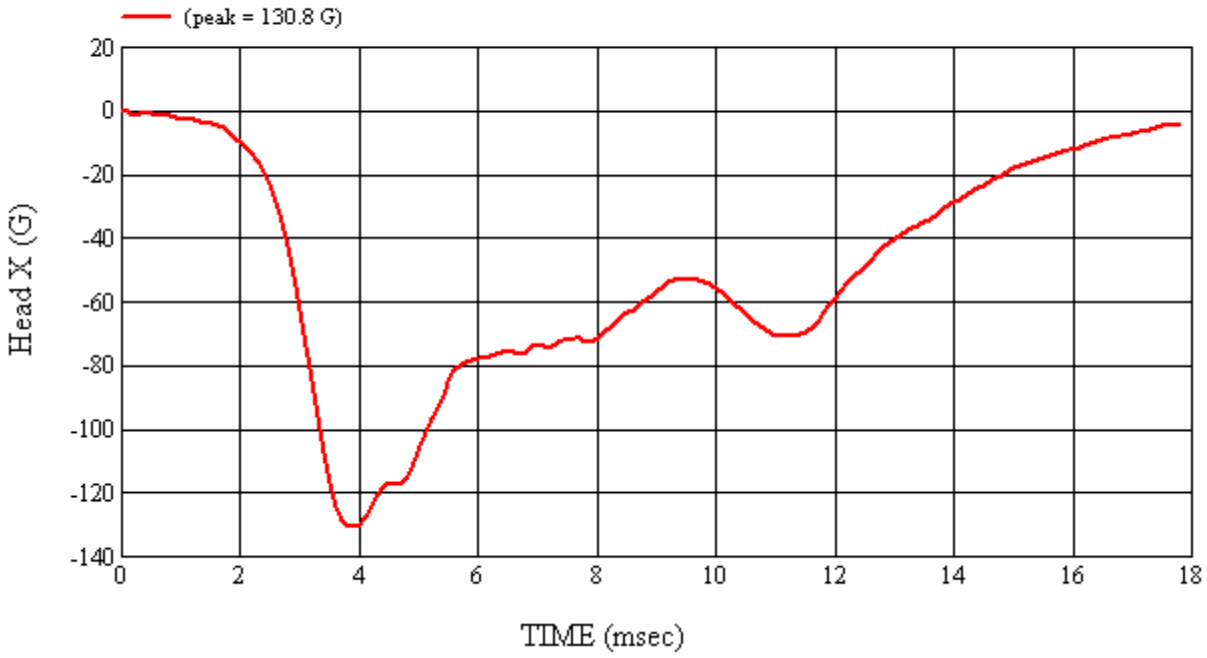
Recorded By: _____ Approved By*: _____ Date: 7/14/2011

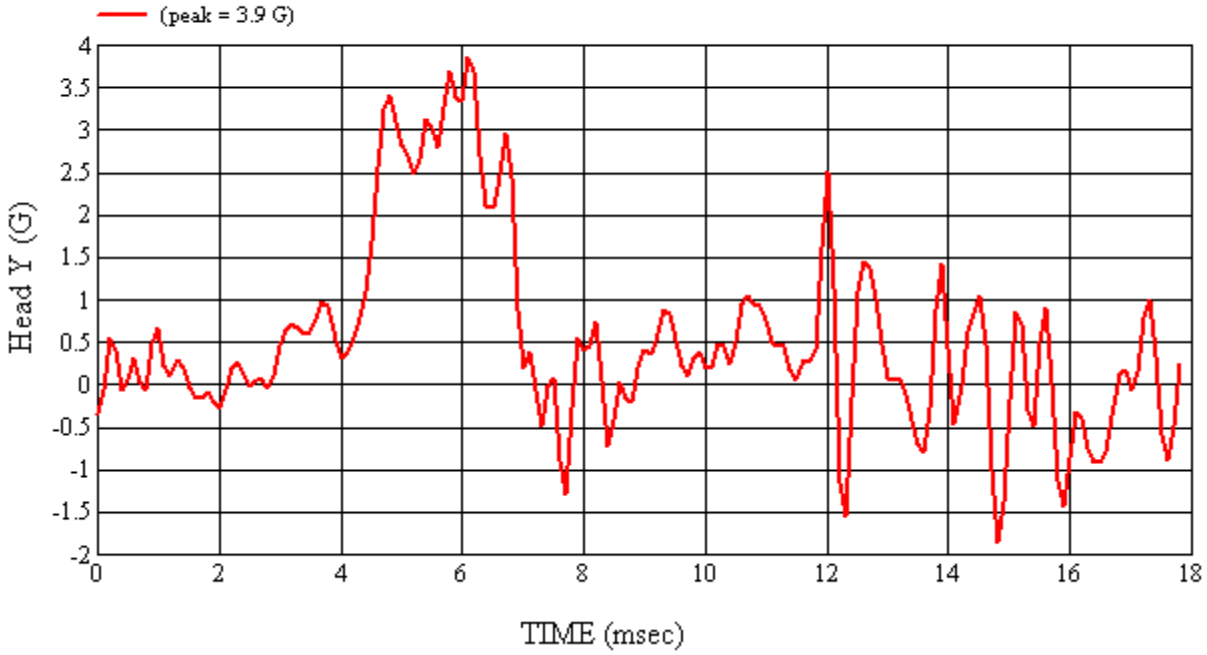
*Only necessary for NHTSA (Government) Compliance testing.

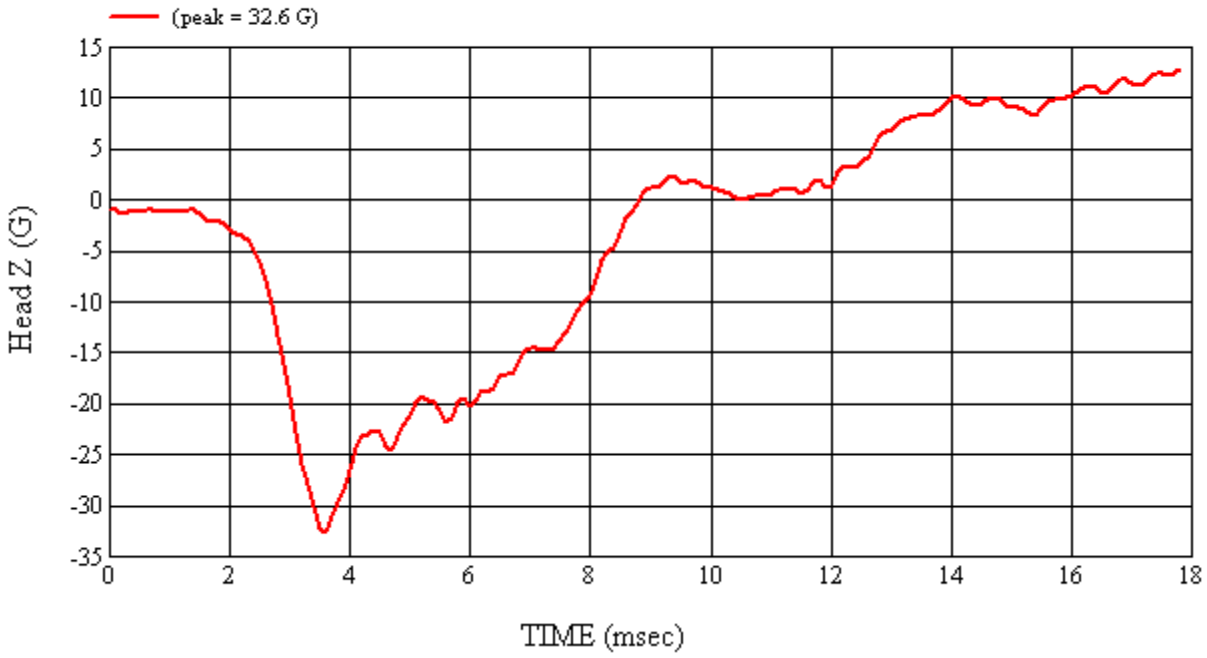
MGA Test #: U11321 Target Location: UR3, Left Side Test Date: 7/14/2011

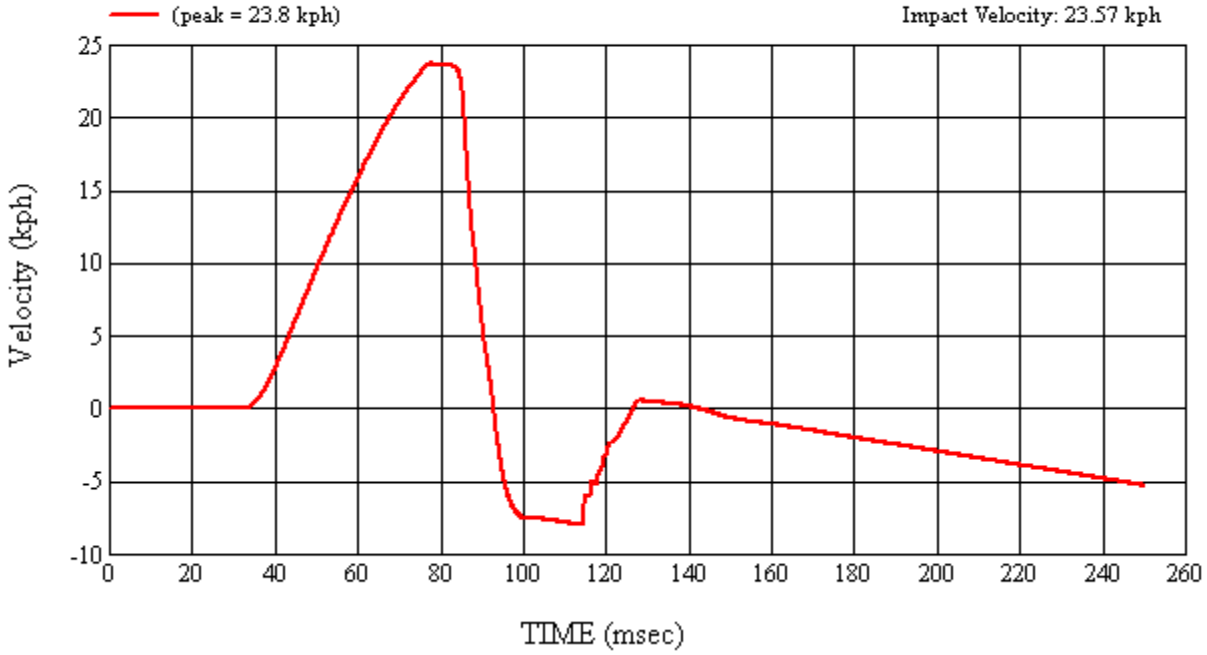


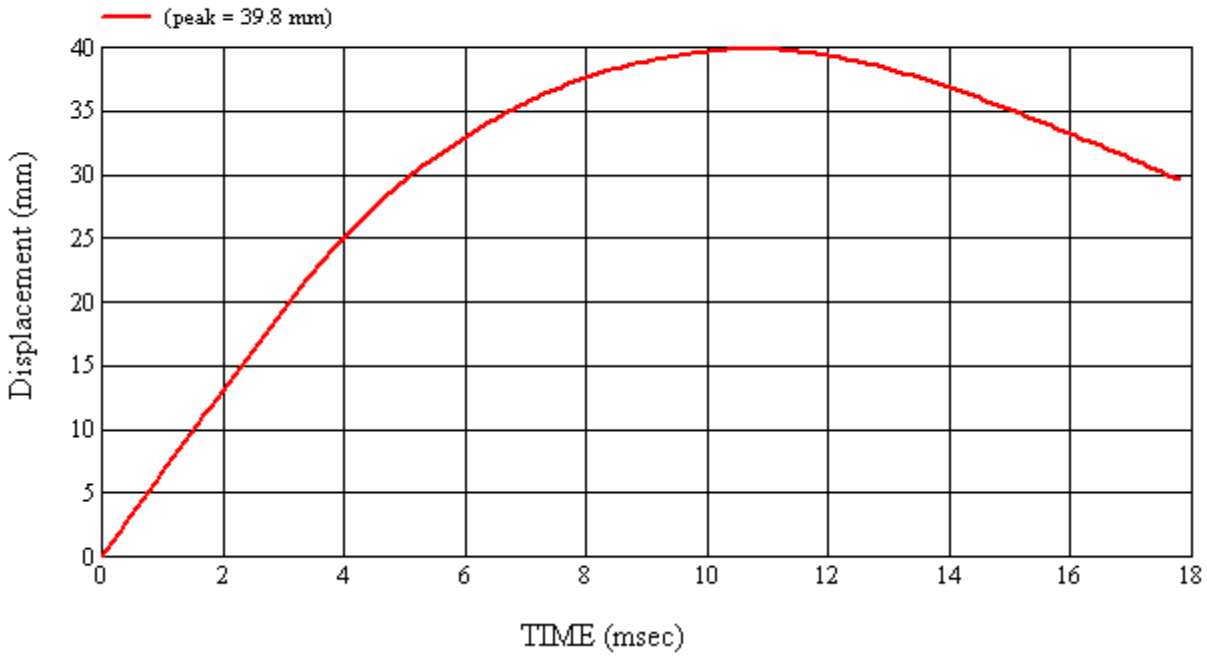


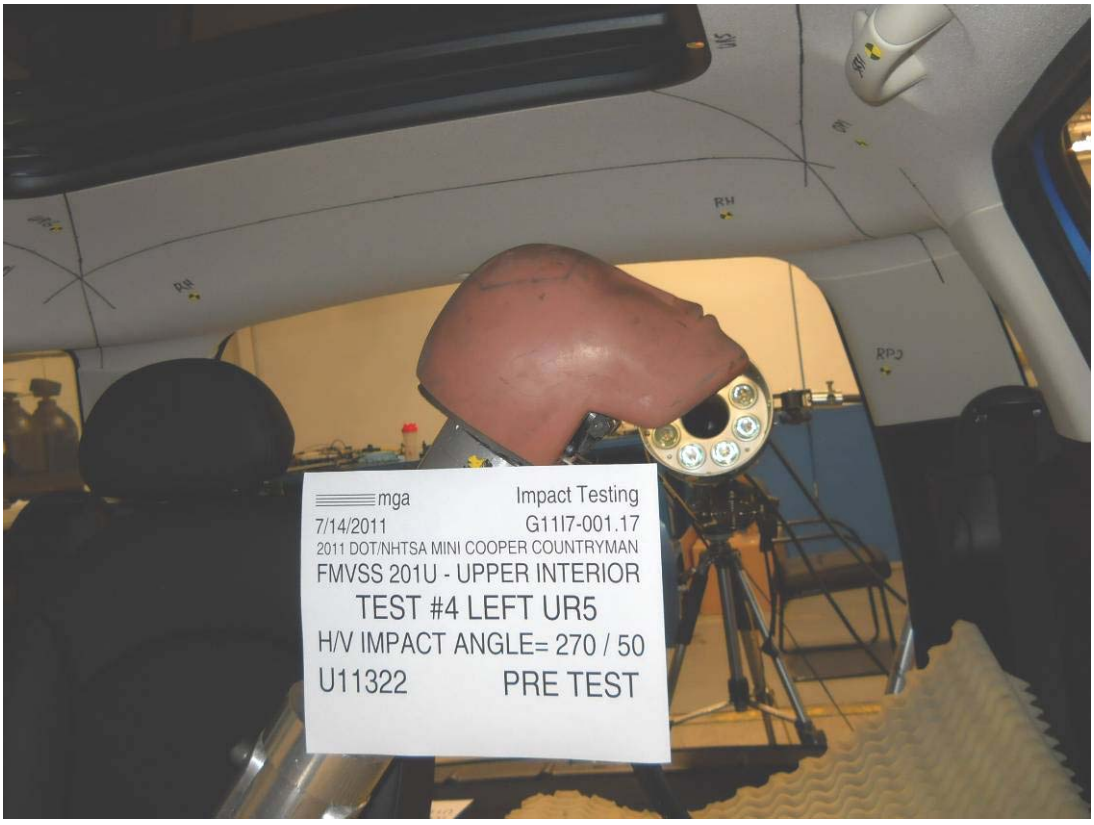

(peak = 130.8 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 3.9 G)
Head Y (G)
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 32.6 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
TIME (msec)


(peak = 23.8 kph)
Impact Velocity: 23.57 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 = 39.8 mm)
Displacement (mm)
0
5
10
15
20
25
30
35
40
0
2
4
6
8
10
12
14
16
18
TIME (msec)

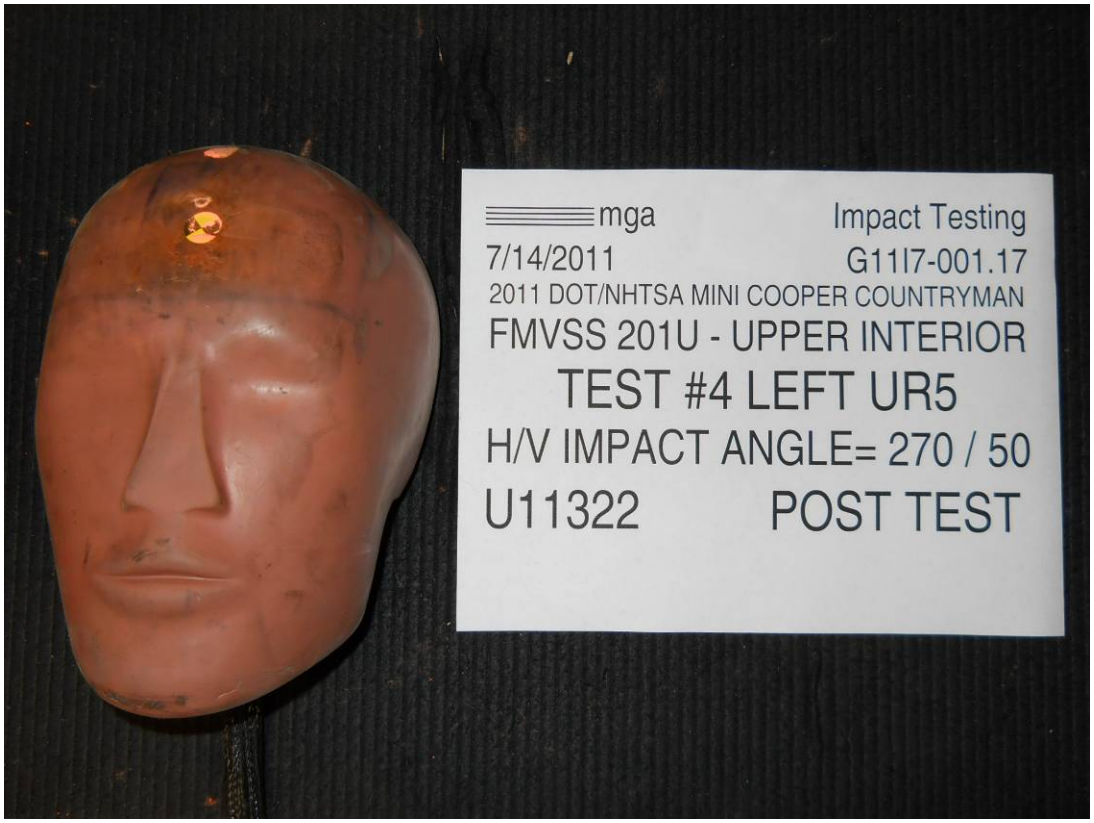

mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR5
H/V IMPACT ANGLE= 270 / 50
U11322
PRE TEST


OP1
SR32
SR31
mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR5
H/V IMPACT ANGLE= 270 / 50
U11322
PRE TEST


CB0508
U11322
LEFT UR5
H/V 270/50
mga
Impact Testing
G11I7-001.17
7/14/2011
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR5
H/V IMPACT ANGLE= 270 / 50
U11322
POST TEST


mga
Impact Testing
G11I7-001.17
7/14/2011
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR5
H/V IMPACT ANGLE= 270 / 50
U11322
POST TEST


UR5
SR32
SR31
OPI


mga
Impact Testing
7/14/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #4 LEFT UR5
H/V IMPACT ANGLE= 270 / 50
U11322
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#4

Target (Vehicle Side): UR5Left

Temperature:22.2C

MGA Test Reference No.:U11322

Humidity:52.9%

Approach Horizontal Angles:270º

Time of Test:1:25:42 PM

Approach Vertical Angles:50º

FMH Serial No:[035]

Additional Description:@ SR3-2

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
662	656	8.2	23.7	27	6 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

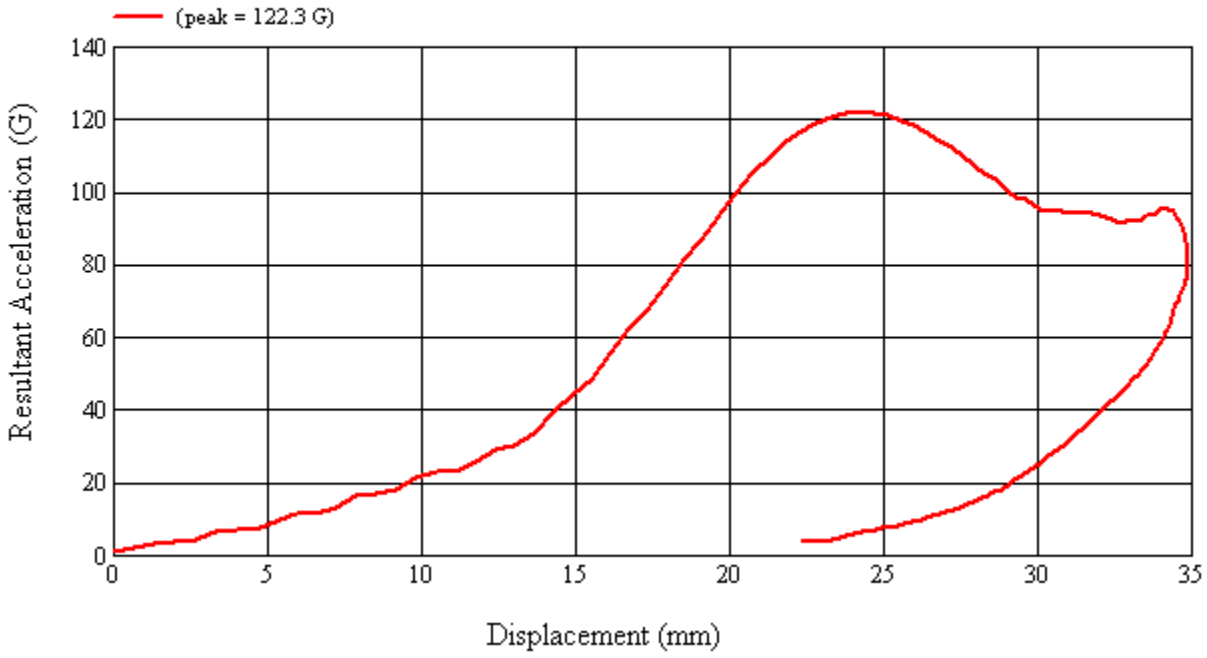
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

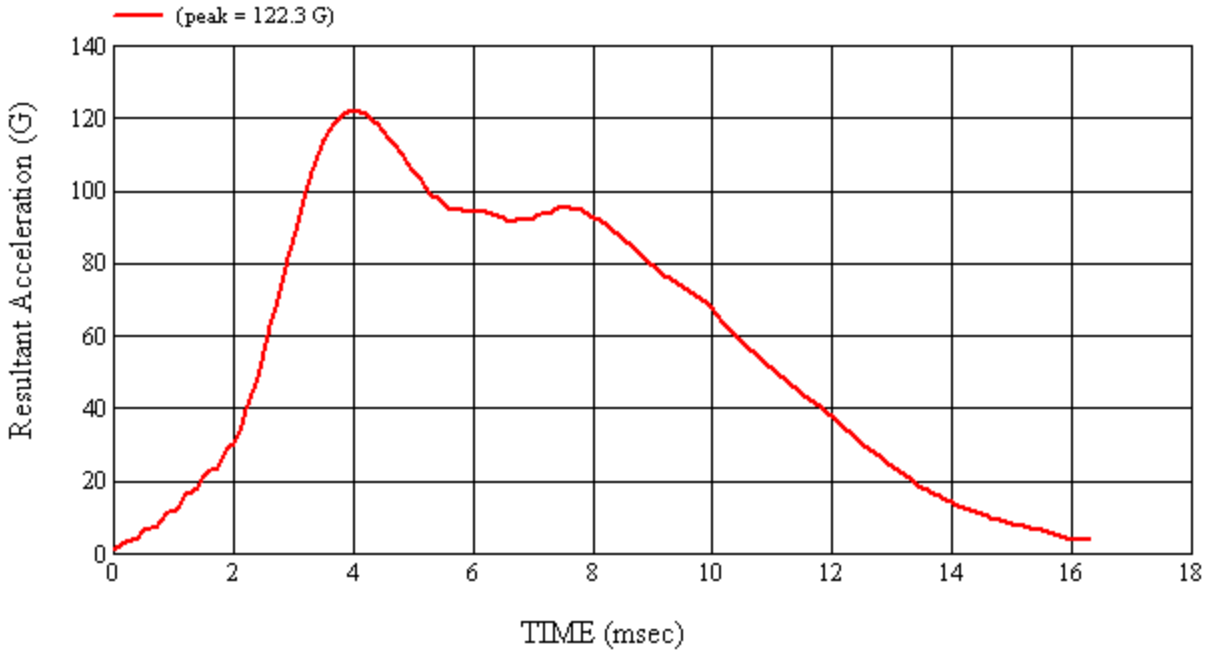
Headliner deformation

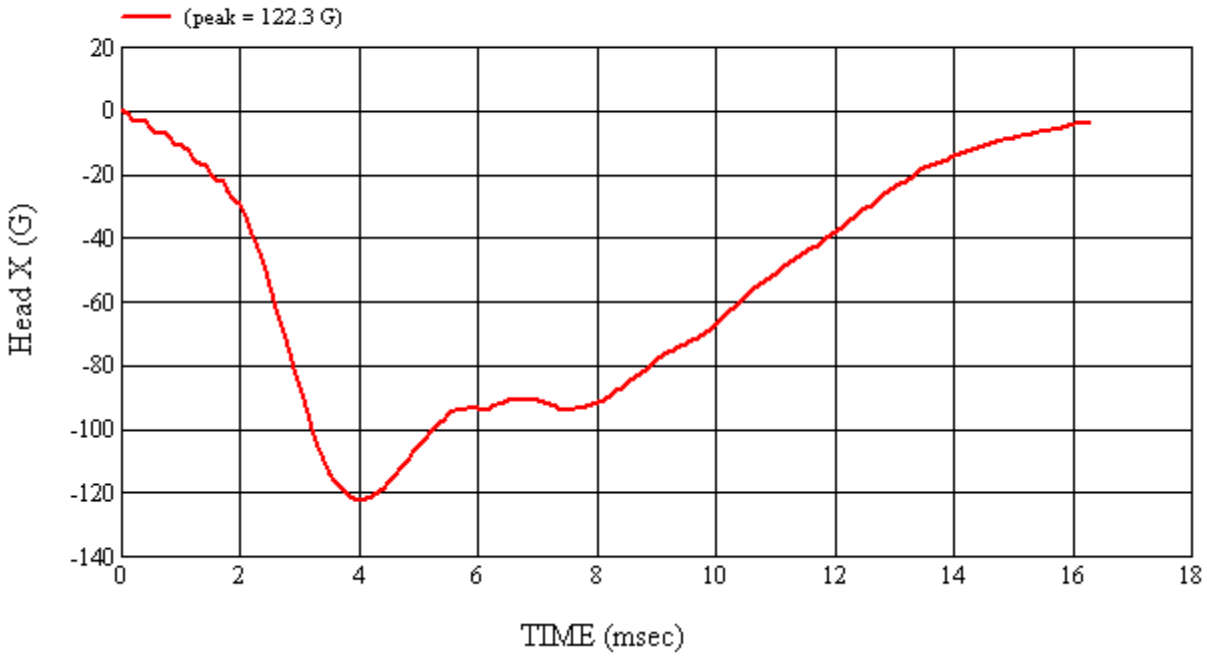
Recorded By: _____ Approved By*: _____ Date: 7/14/2011

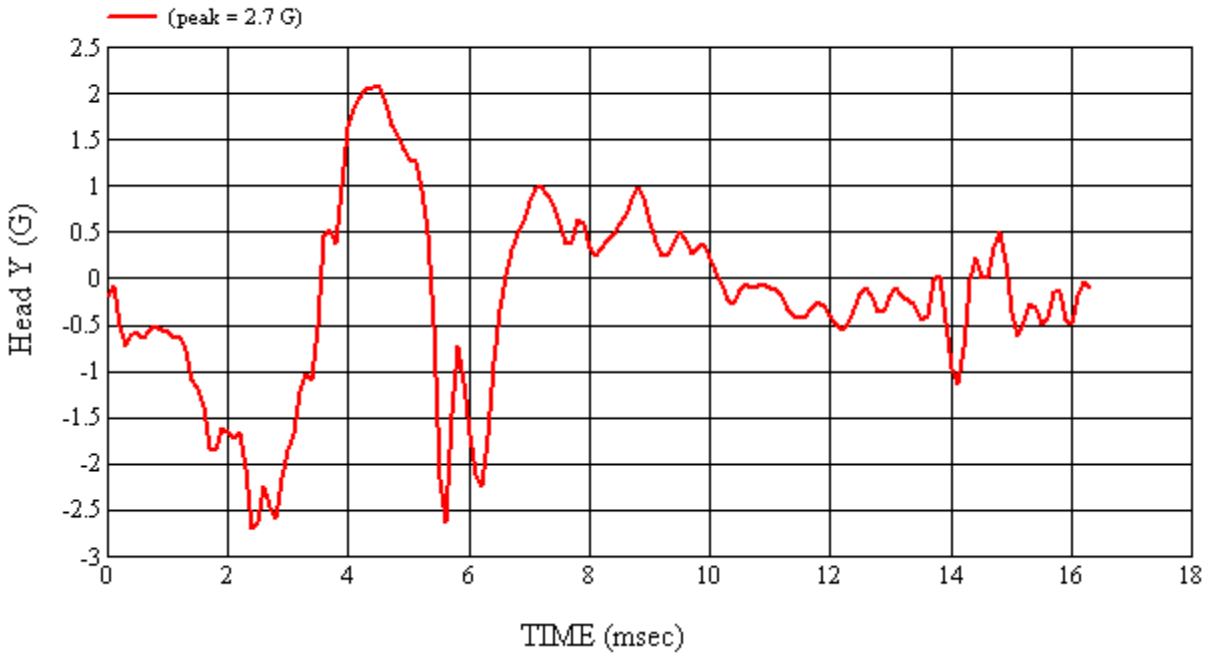
*Only necessary for NHTSA (Government) Compliance testing.

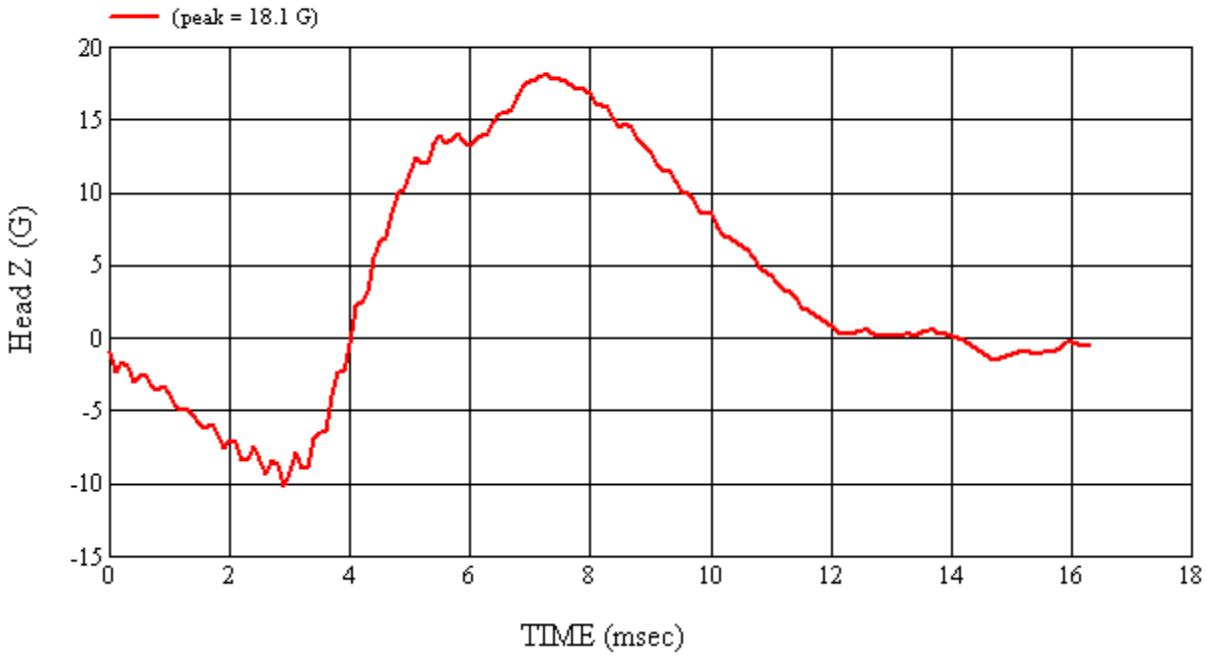
MGA Test #: U11322 Target Location: UR5, Left Side Test Date: 7/14/2011

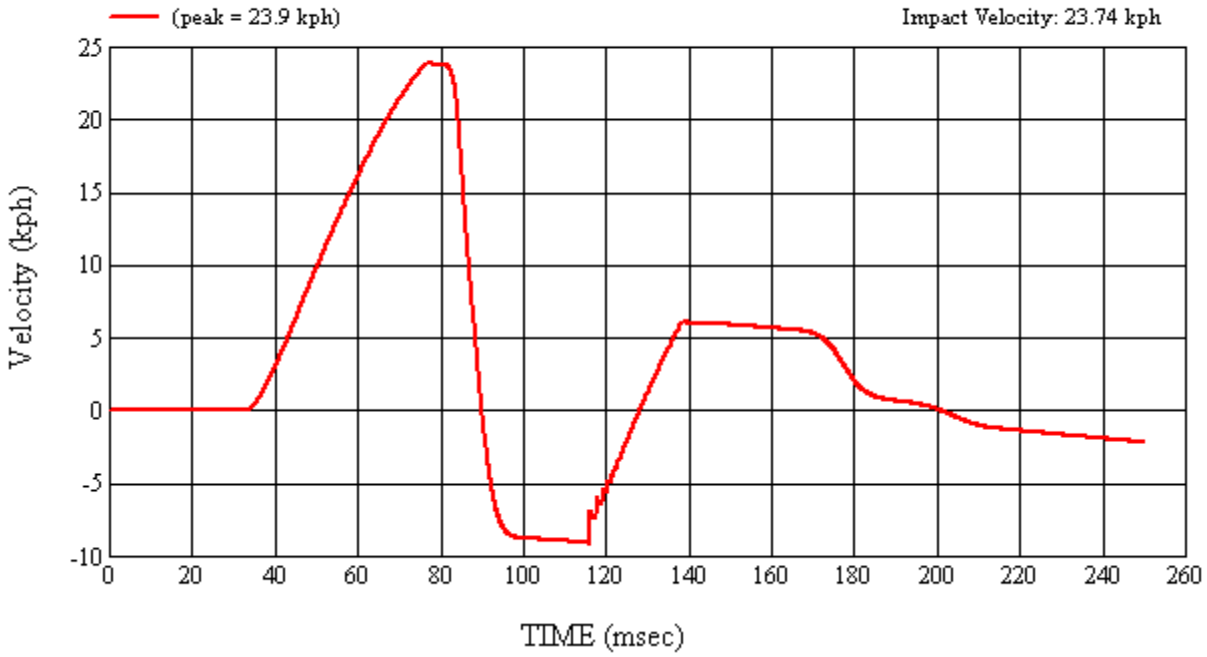


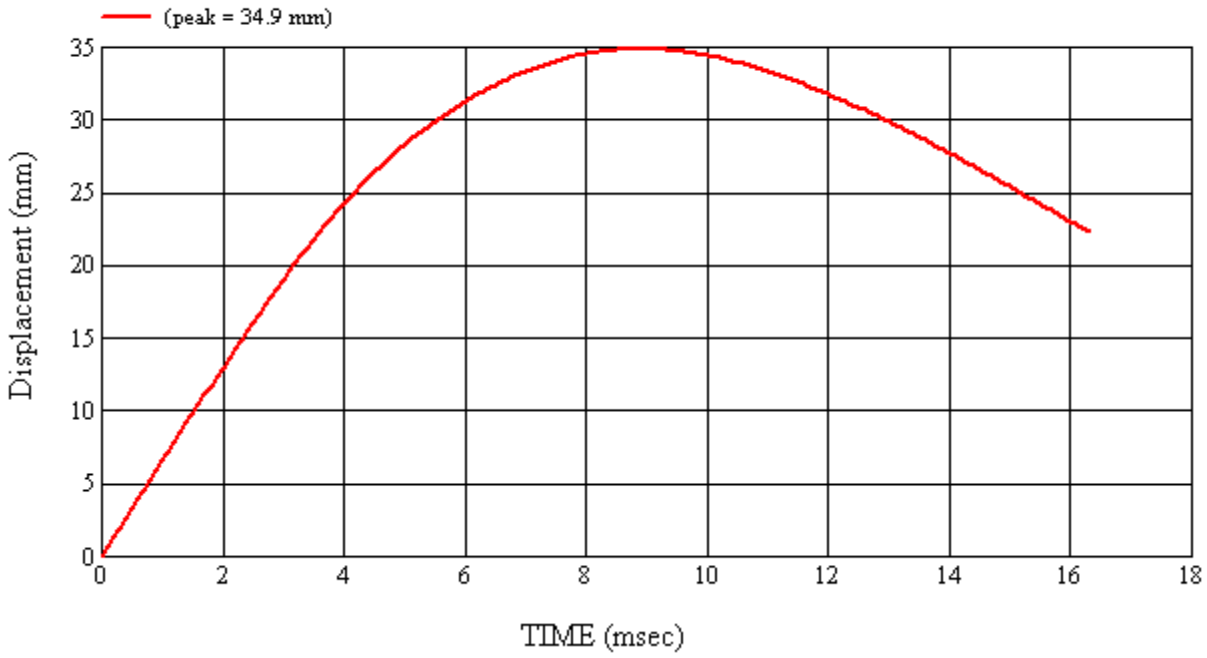



(peak = 122.3 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
0
2
4
6
8
10
12
14
16
18
TIME (msec)

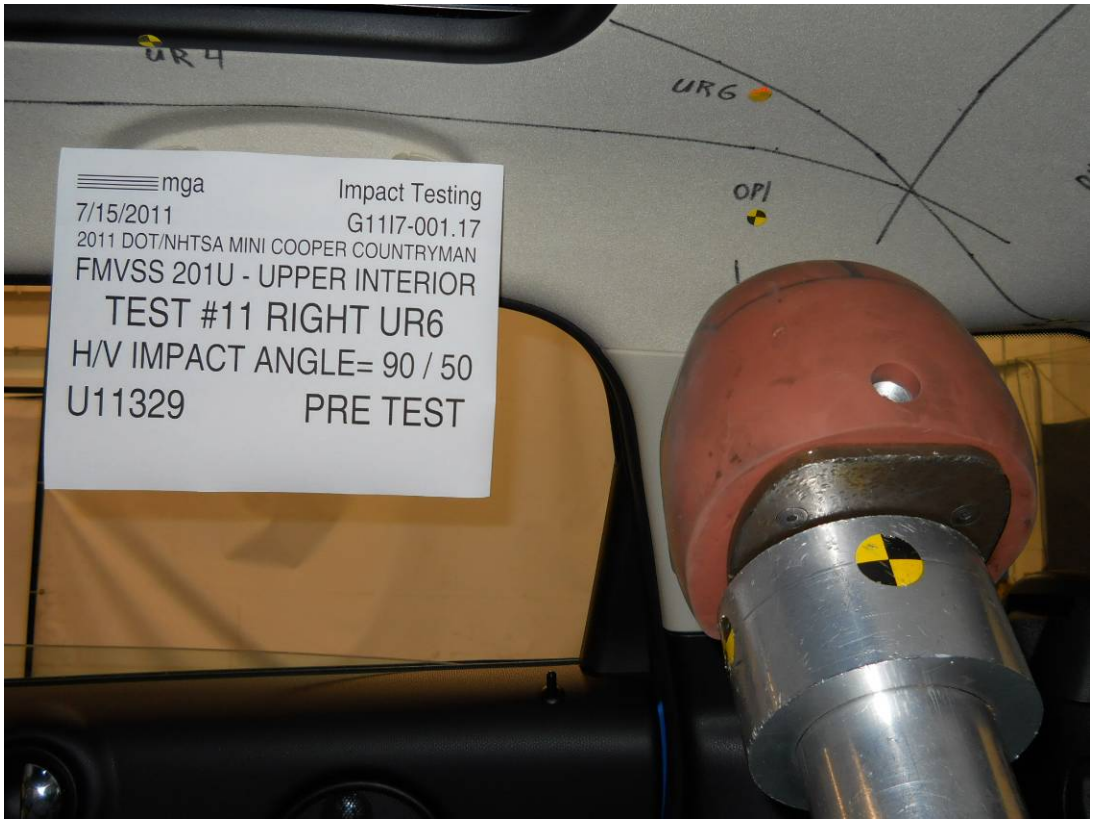

(peak = 2.7 G)
Head Y (G)
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
0
2
4
6
8
10
12
14
16
18
TIME (msec)


(peak = 18.1 G)
Head Z (G)
20
15
10
5
0
-5
-10
-15
0
2
4
6
8
10
12
14
16
18
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)

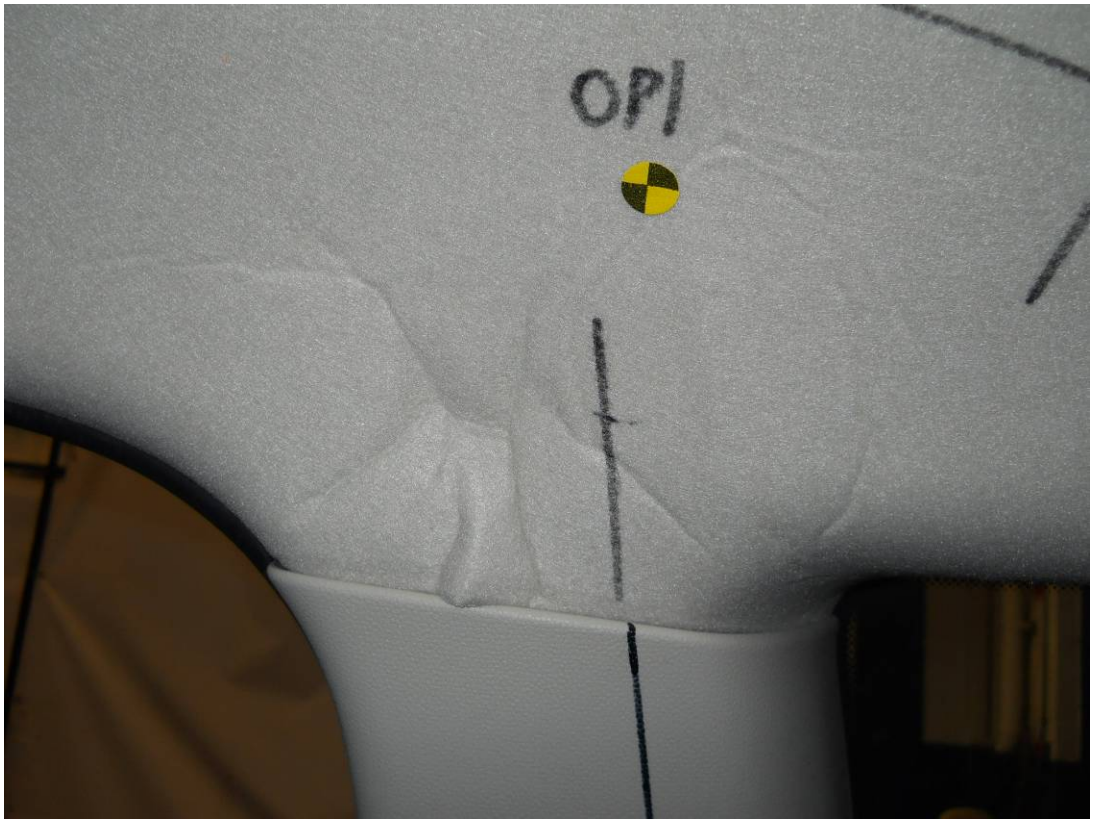

(peak = 34.9 mm)
Displacement (mm)
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
TIME (msec)


UR6
RH
RP2
mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR6
H/V IMPACT ANGLE= 90 / 50
U11329
PRE TEST


UR4
UR6
OPI
mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR6
H/V IMPACT ANGLE= 90 / 50
U11329
PRE TEST


RH
RP2
mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR6
H/V IMPACT ANGLE= 90 / 50
U11329
POST TEST


UR6
OP1
OP2
mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR6
H/V IMPACT ANGLE= 90 / 50
U11329
POST TEST


OPI


mga
Impact Testing
7/15/2011
G11I7-001.17
2011 DOT/NHTSA MINI COOPER COUNTRYMAN
FMVSS 201U - UPPER INTERIOR
TEST #11 RIGHT UR6
H/V IMPACT ANGLE= 90 / 50
U11329
POST TEST

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.17

VEHICLE YR/MAKE/MODEL:2011/DOT/NHTSA/Mini Cooper Countryman

GENERAL TEST PARAMETERS:

Test Number:#11

Target (Vehicle Side): UR6Right

Temperature:23.5C

MGA Test Reference No.:U11329

Humidity:51.2%

Approach Horizontal Angles:90º

Time of Test:4:11:44 PM

Approach Vertical Angles:50º

FMH Serial No:[037]

Additional Description:@ OP1

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
802	842	4.7	23.6	41	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

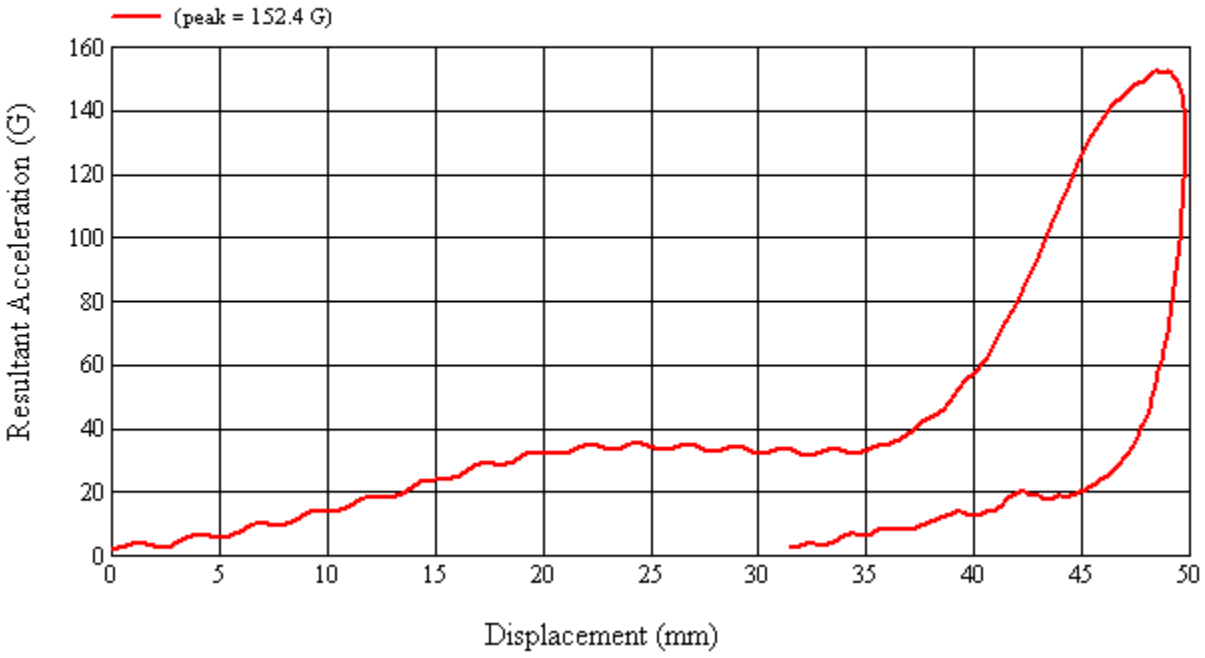
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

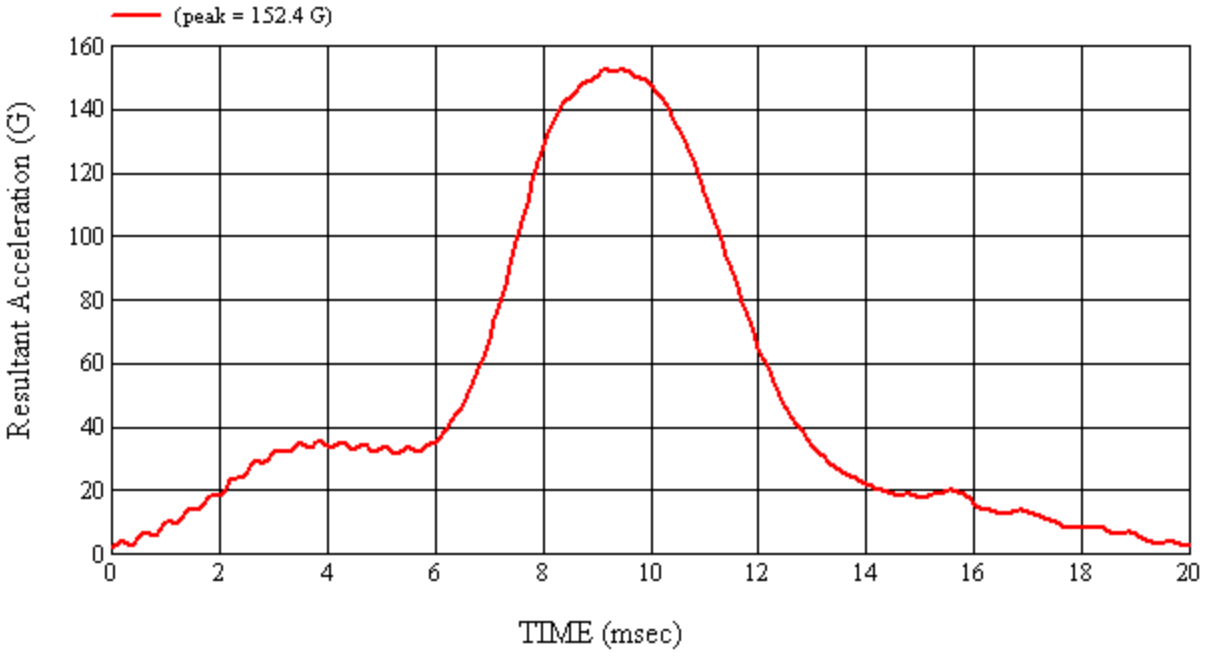
Headliner deformation, dislodged headliner

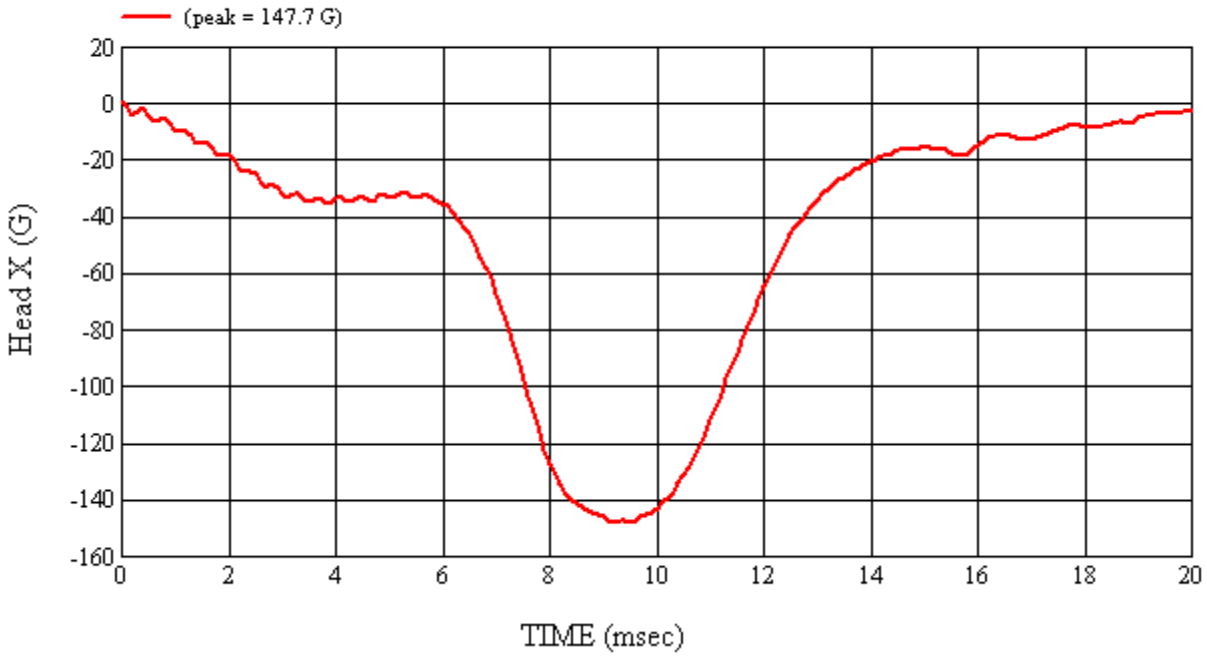
Recorded By: _____ Approved By*: _____ Date: 7/15/2011

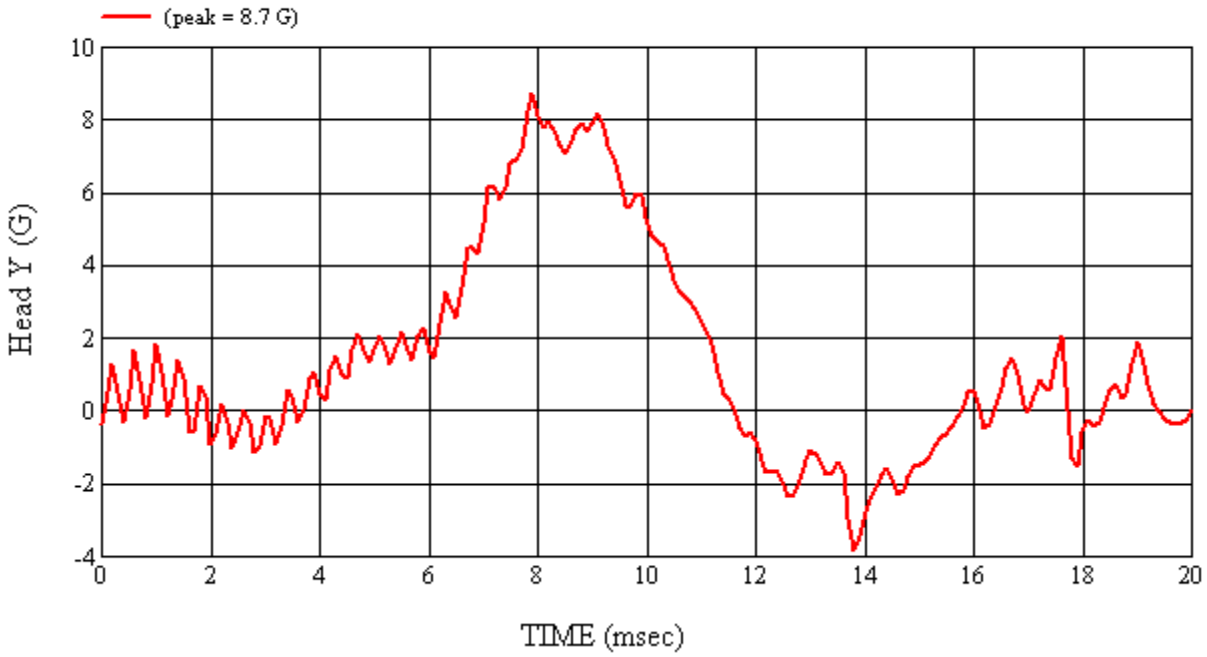
*Only necessary for NHTSA (Government) Compliance testing.

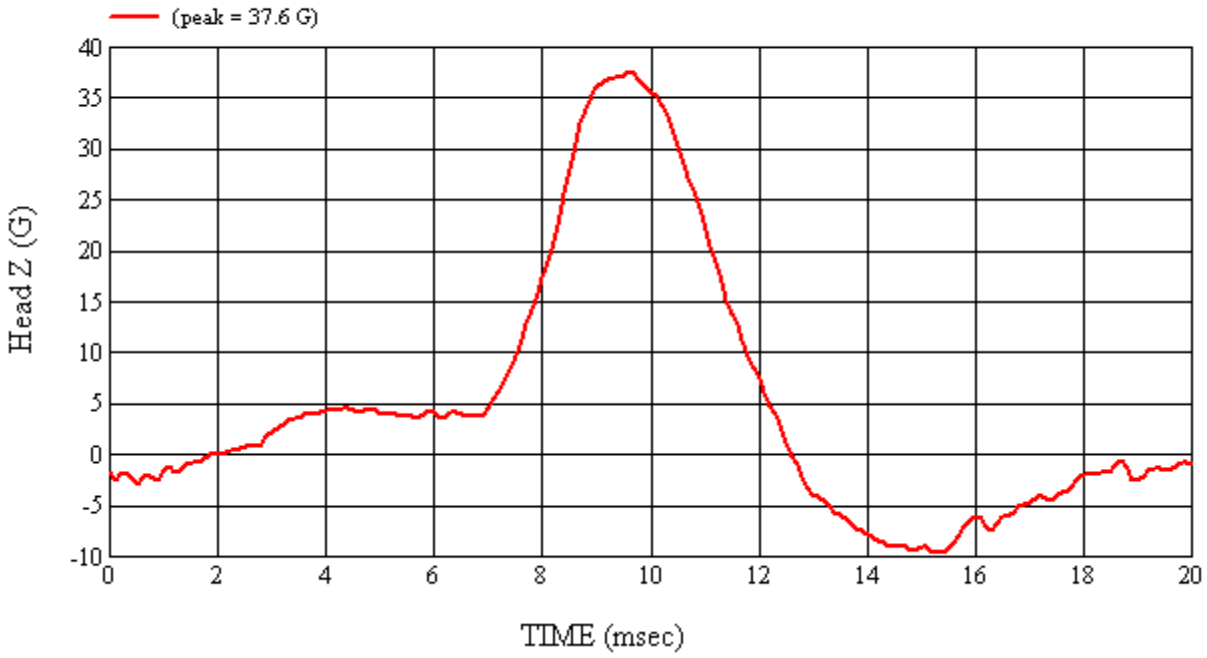
MGA Test #: U11329 Target Location: UR6, Right Side Test Date: 7/15/2011

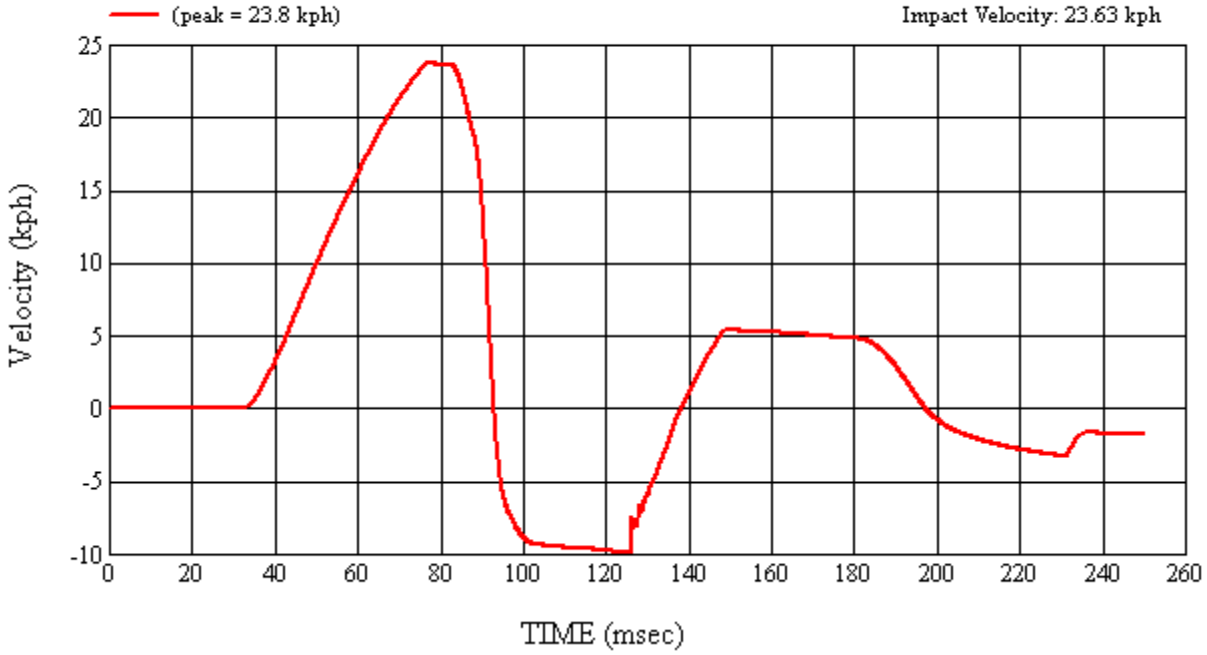


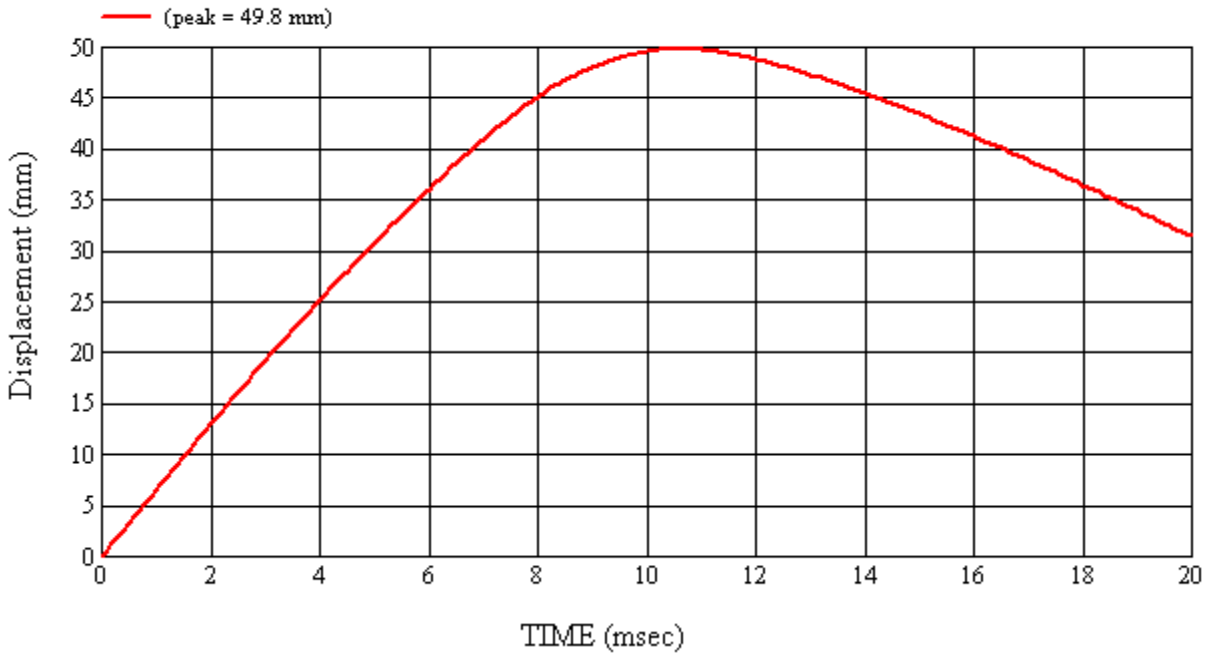



(peak = 147.7 G)
Head X (G)
20
0
-20
-40
-60
-80
-100
-120
-140
-160
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 8.7 G)
Head Y (G)
10
8
6
4
2
0
-2
-4
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 37.6 G)
Head Z (G)
40
35
30
25
20
15
10
5
0
-5
-10
0
2
4
6
8
10
12
14
16
18
20
TIME (msec)


(peak = 23.8 kph)
Impact Velocity: 23.63 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 = 49.8 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
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 Technologies	G10020001619	Targeting	0.1 mm	Annual
Measuring Devices: - Tape Measure - Plumb Bobs - Digital Protractor	 Stanley N/A Mitutoyo	 TPM112 -- 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	MGA00081	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	7/13/2011	9.90	23.0	51.8	245.3	4.8	Yes
Post	#035	7/18/2011	9.90	24.7	60.9	247.8	4.0	Yes
Pre	#037	7/13/2011	9.96	23.0	51.6	255.8	5.0	Yes
Post	#037	7/18/2011	9.96	24.7	60.5	261.4	8.2	Yes
Pre	#038	7/13/2011	9.90	23.1	49.2	247.6	12.2	Yes
Post	#038	7/18/2011	9.90	25.5	60.6	263.6	12.3	Yes

4-1 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

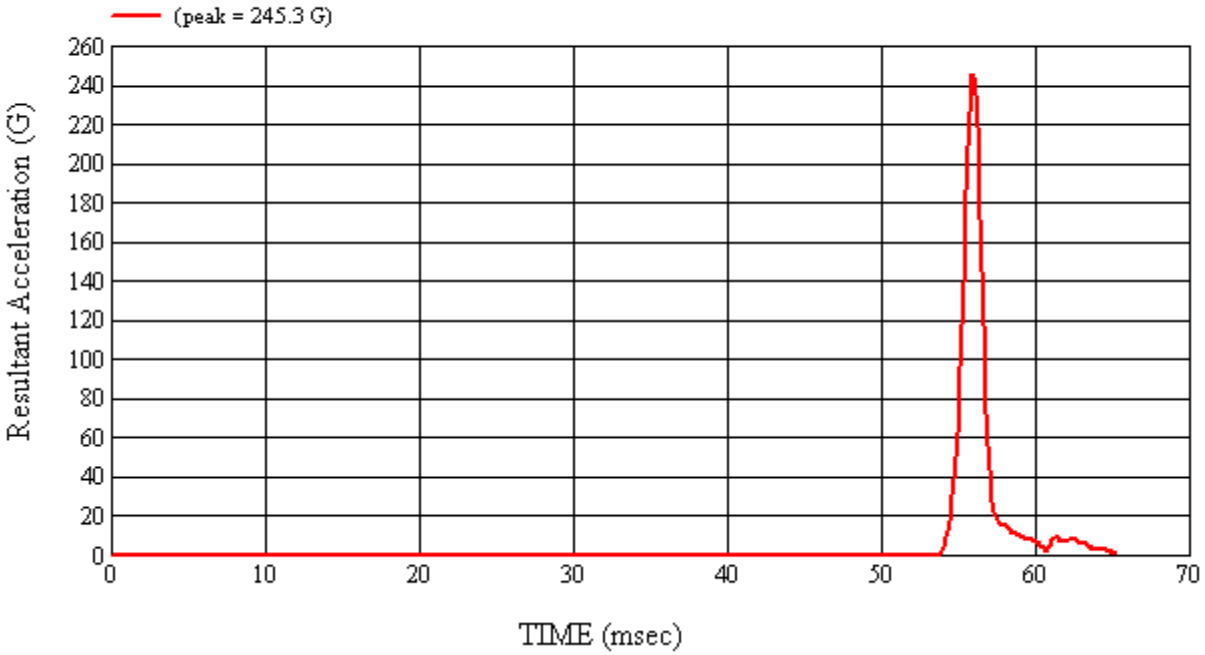
HEADFORM SERIAL NUMBER: 035	CALIBRATION DATE: 7/13/2011 CALIBRATION TIME: 4:32:36 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	23.0
Relative Humidity	10% to 70%	51.8
Peak Resultant Acceleration	225 G's to 275 G's	245.3
Peak Lateral Acceleration	15 G's Maximum	4.8
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

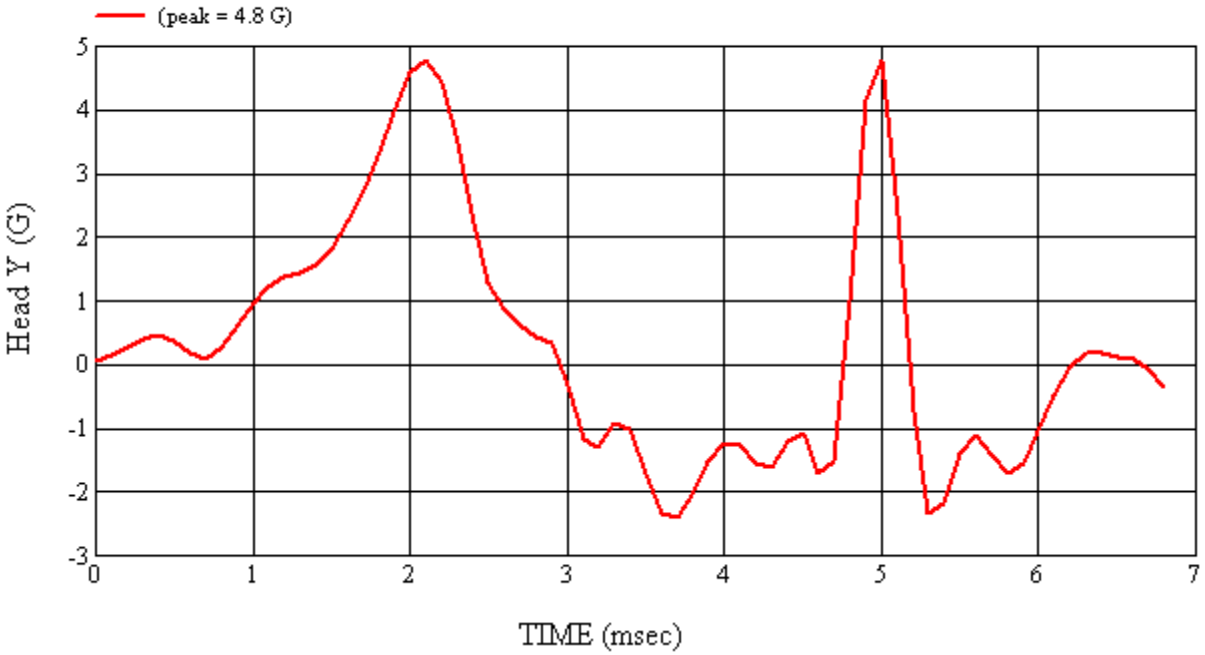
REMARKS:

RECORDED BY: Kevin D. McKenna DATE: 7/13/2011

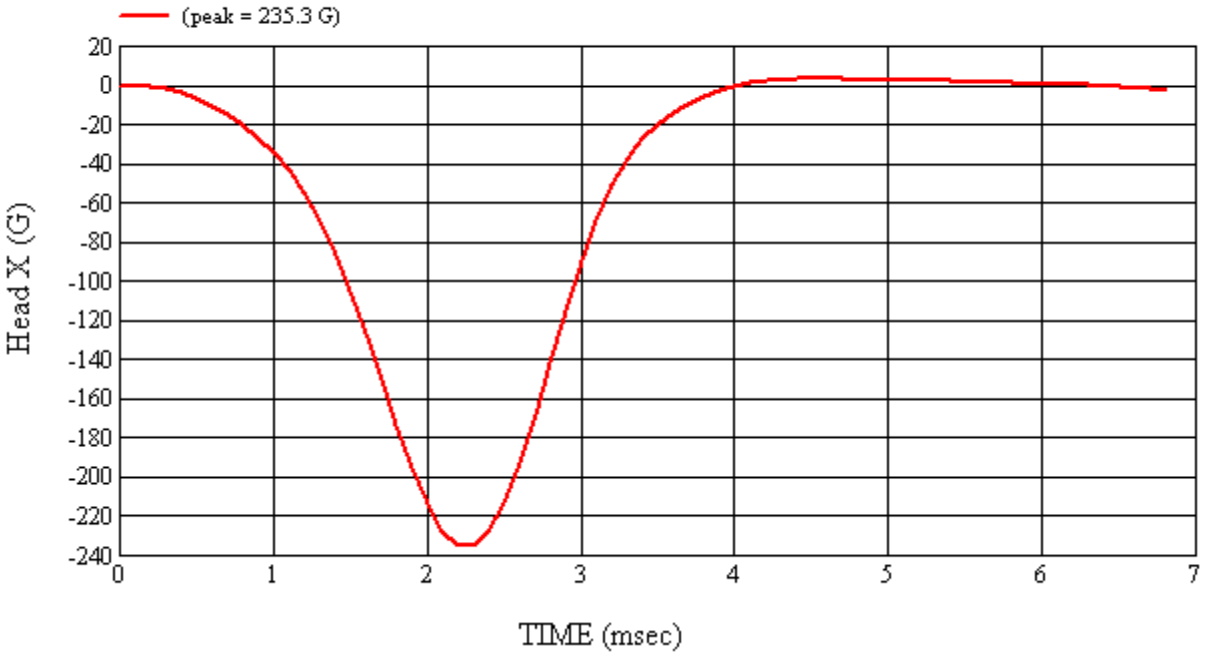
APPROVED BY: Nathaniel Smith



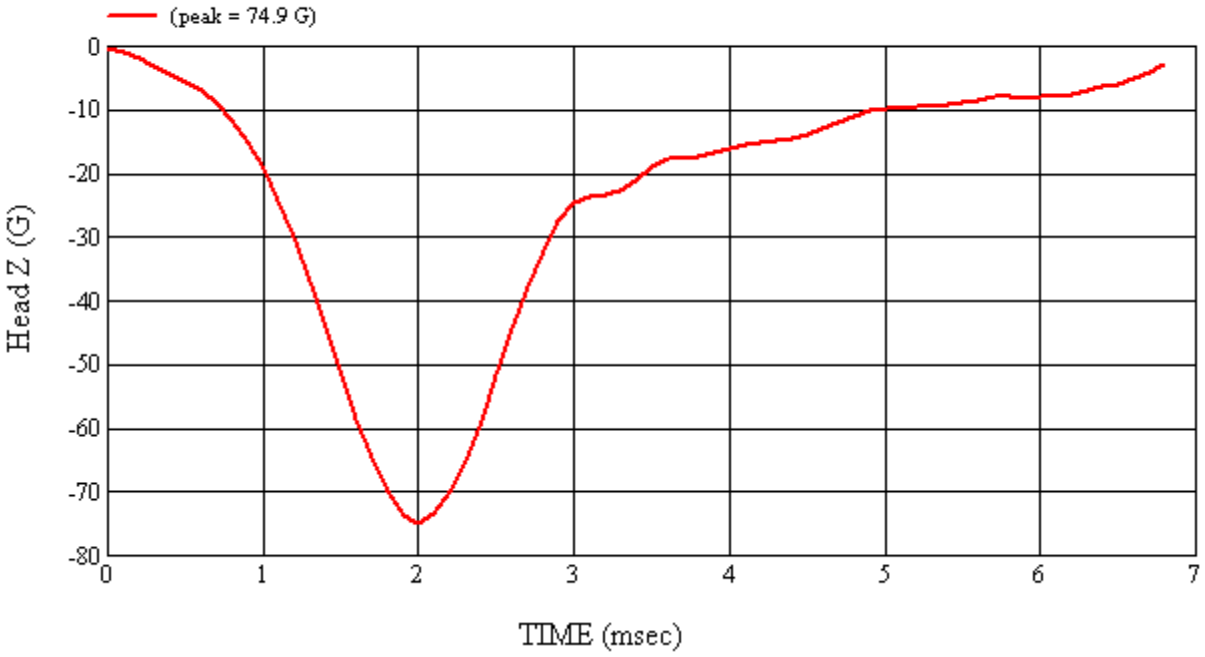
Head 035 (Pre) Calibration #H35041



Head 035 (Pre) Calibration #H35041



Head 035 (Pre) Calibration #H35041



Head 035 (Pre) Calibration #H35041

4-2 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: 035	CALIBRATION DATE: 7/18/2011 CALIBRATION TIME: 1:31:58 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	24.7
Relative Humidity	10% to 70%	60.9
Peak Resultant Acceleration	225 G's to 275 G's	247.8
Peak Lateral Acceleration	15 G's Maximum	4.0
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION

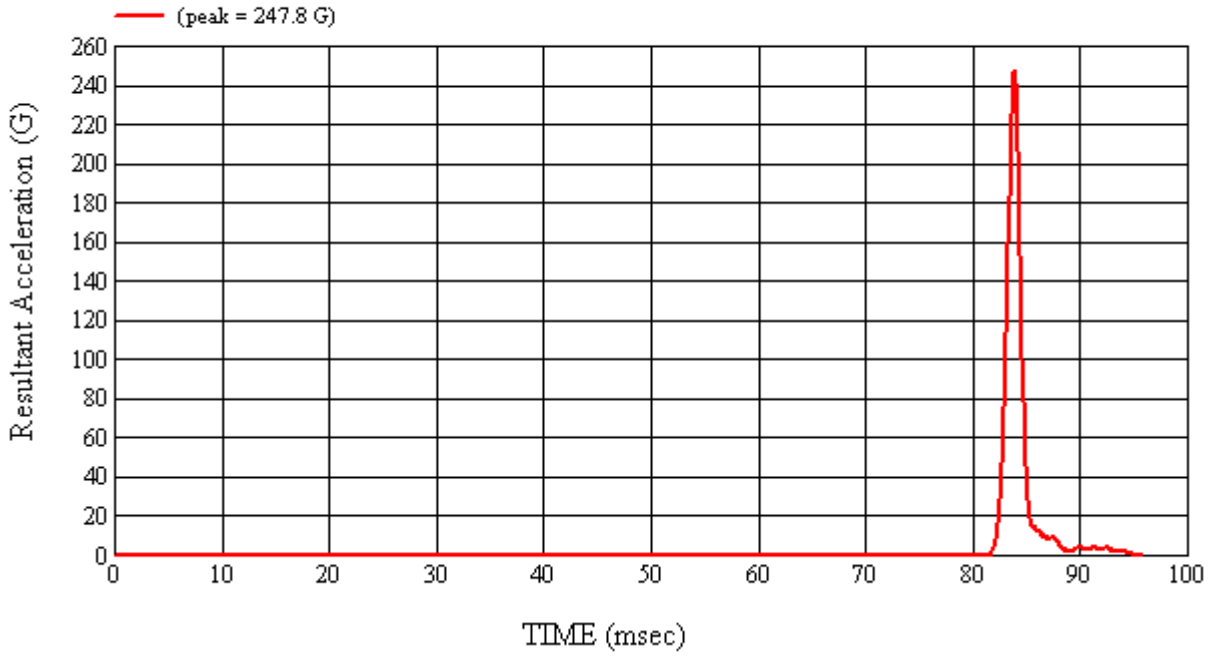
HEAD ACCELEROMETERS

Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	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

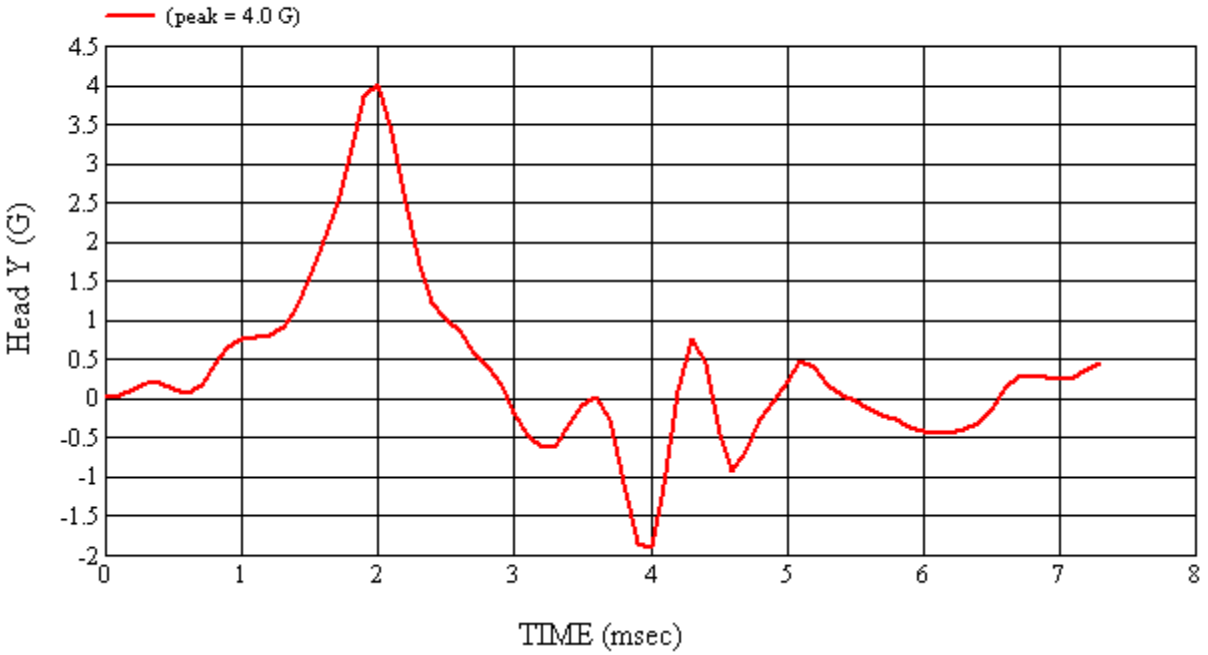
REMARKS:

RECORDED BY: _____ DATE: __7/18/2011____

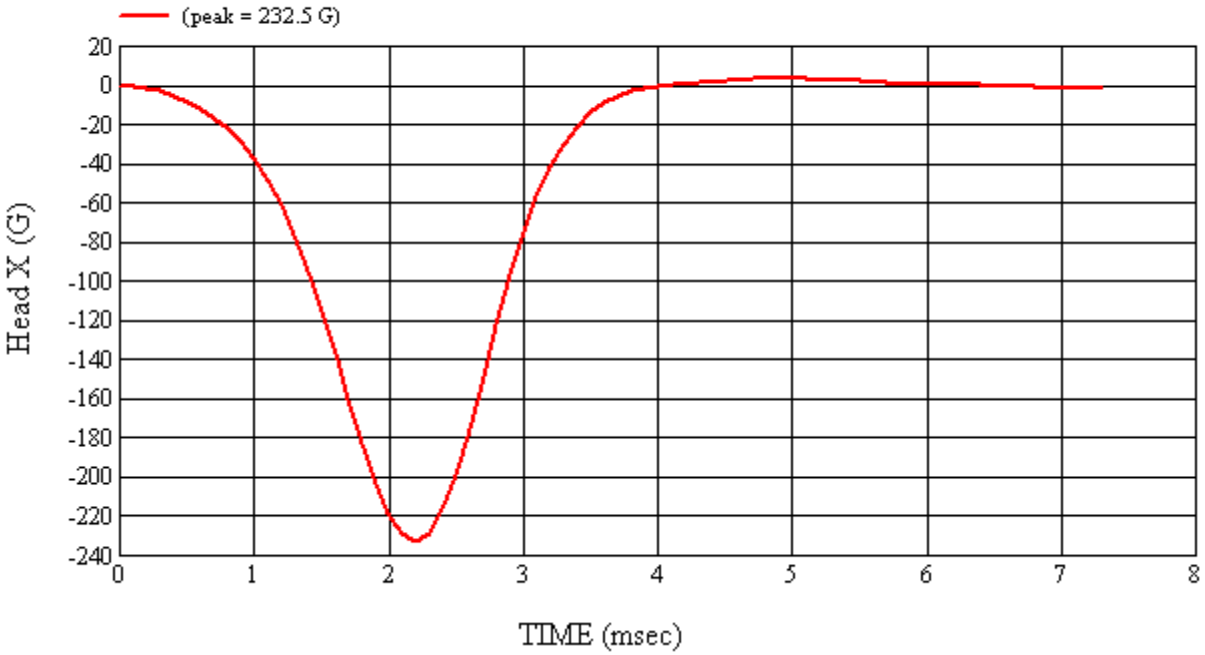
APPROVED BY: _____



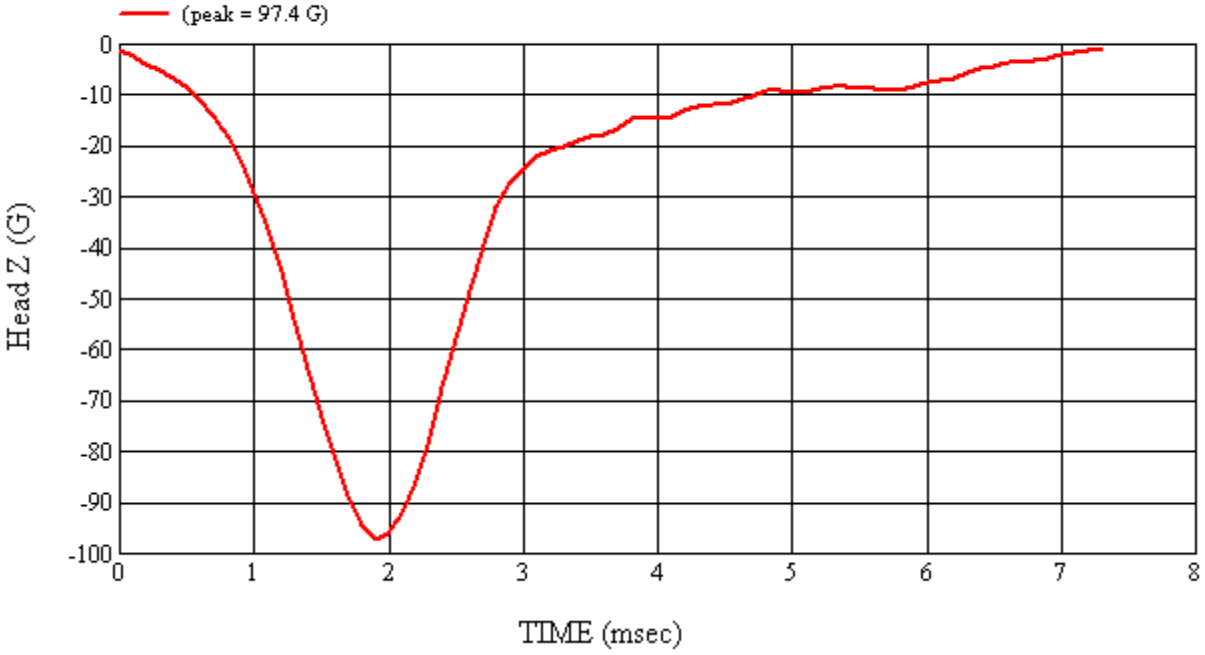
Head 035 (Post) Calibration #H35042



Head 035 (Post) Calibration #H35042



Head 035 (Post) Calibration #H35042



Head 035 (Post) Calibration #H35042

4-3 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

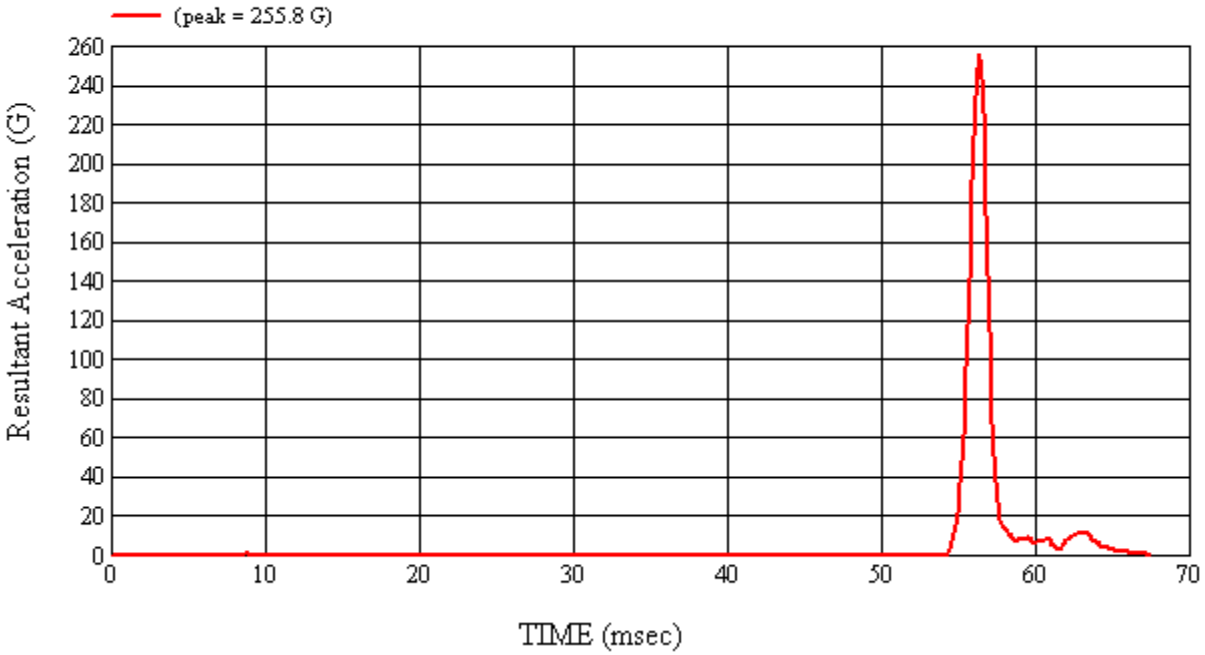
HEADFORM SERIAL NUMBER: 037	CALIBRATION DATE: 7/13/2011 CALIBRATION TIME: 4:46:24 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	23.0
Relative Humidity	10% to 70%	51.6
Peak Resultant Acceleration	225 G's to 275 G's	255.8
Peak Lateral Acceleration	15 G's Maximum	5.0
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

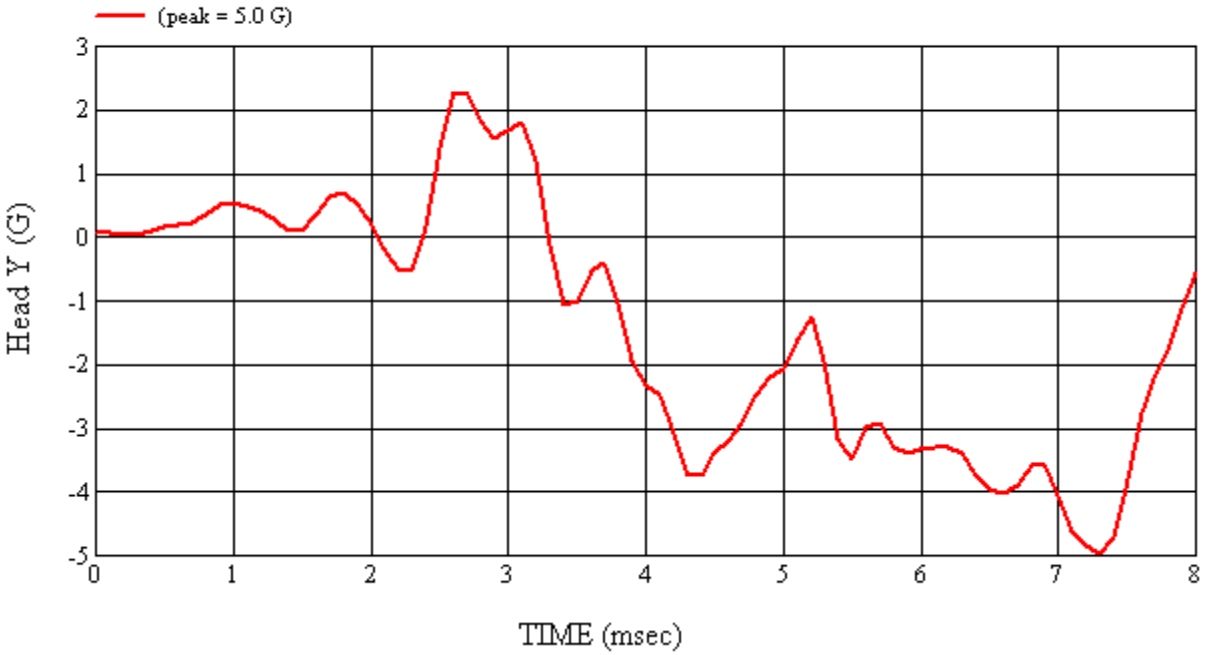
REMARKS:

RECORDED BY: _____ DATE: __7/13/2011____

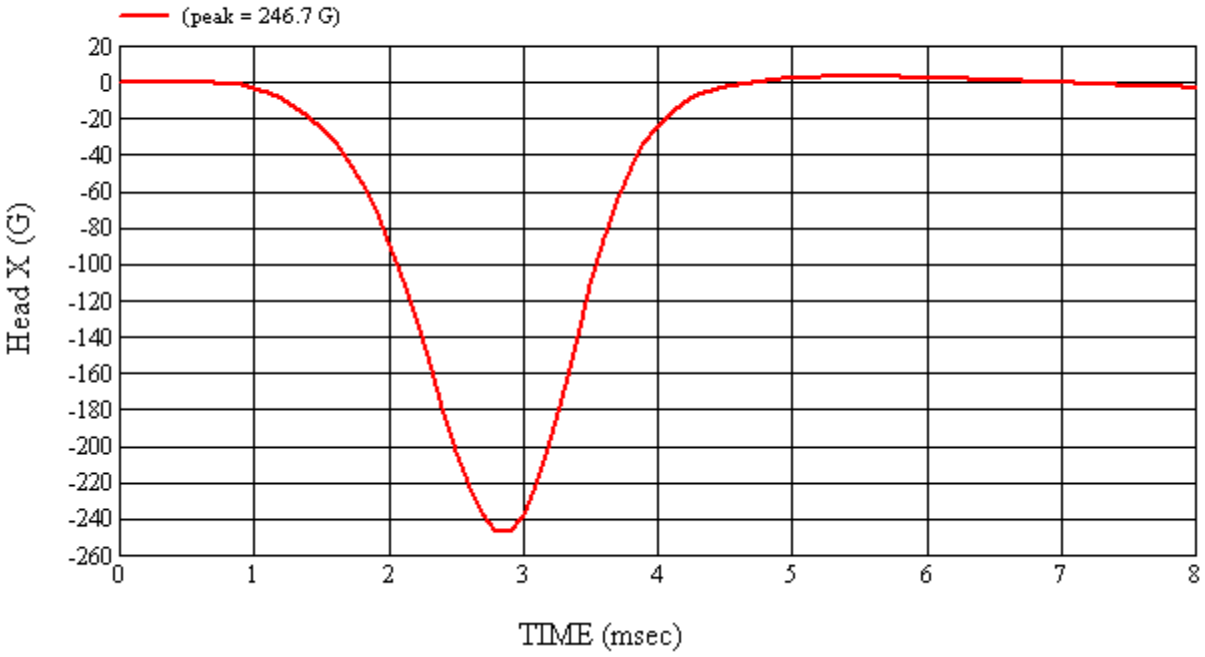
APPROVED BY: _____



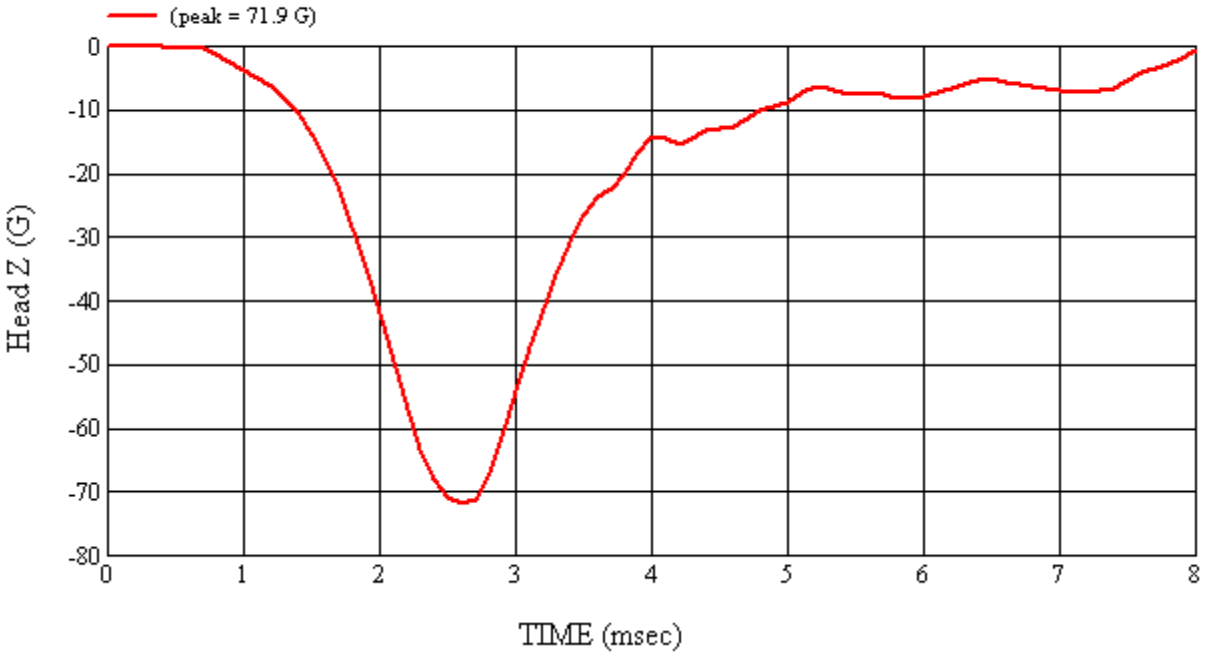
Head 037 (Pre) Calibration #H37041



Head 037 (Pre) Calibration #H37041



Head 037 (Pre) Calibration #H37041



Head 037 (Pre) Calibration #H37041

4-4 Post-Test Calibration

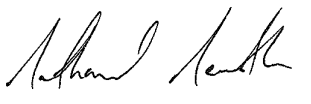
HEAD DROP TEST SUMMARY
PART 572L

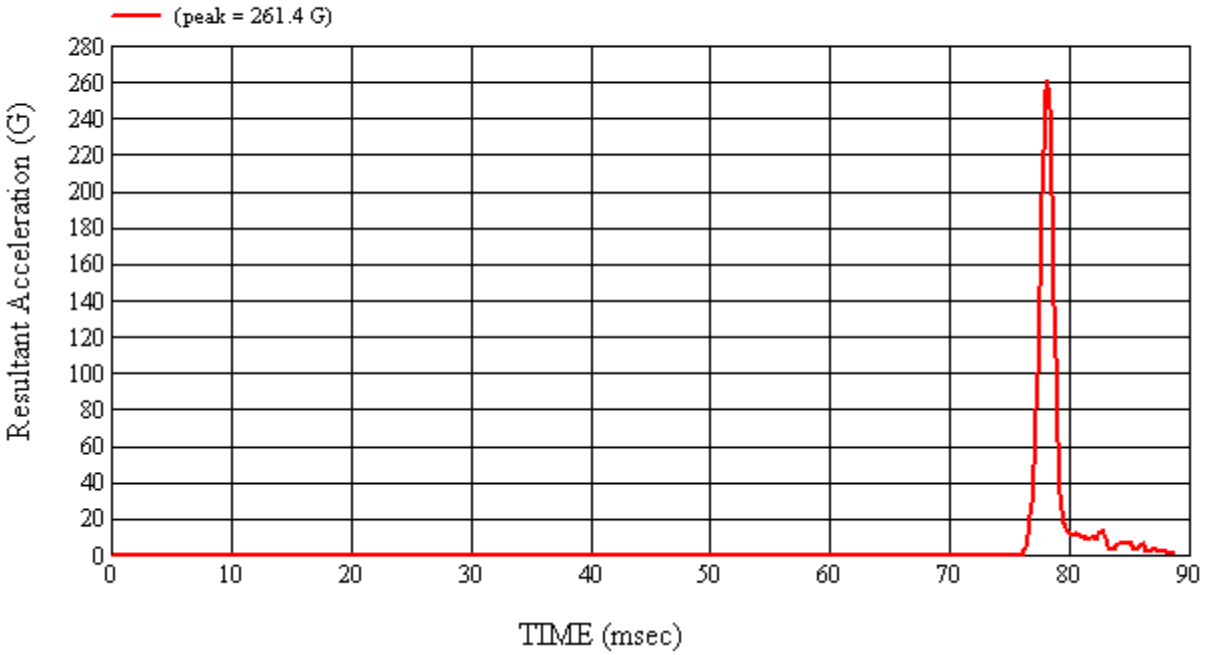
HEADFORM SERIAL NUMBER: 037	CALIBRATION DATE: 7/18/2011 CALIBRATION TIME: 2:00:31 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	24.7
Relative Humidity	10% to 70%	60.5
Peak Resultant Acceleration	225 G's to 275 G's	261.4
Peak Lateral Acceleration	15 G's Maximum	8.2
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	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

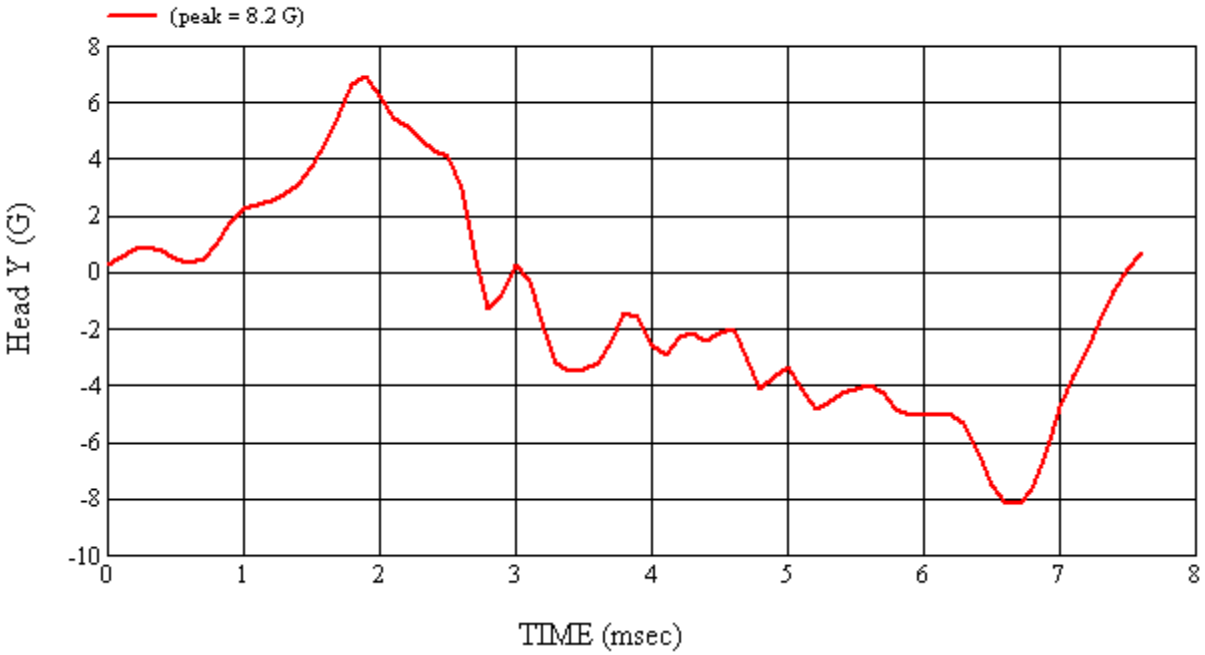
REMARKS:

RECORDED BY:  DATE: 7/18/2011

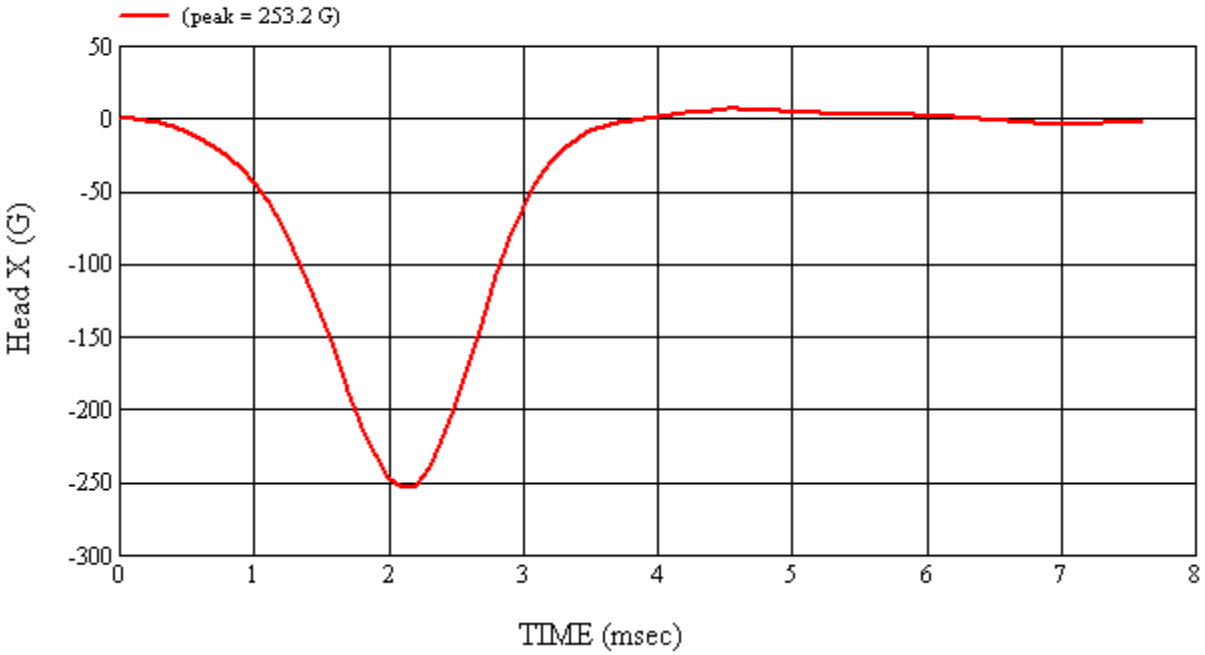
APPROVED BY: 



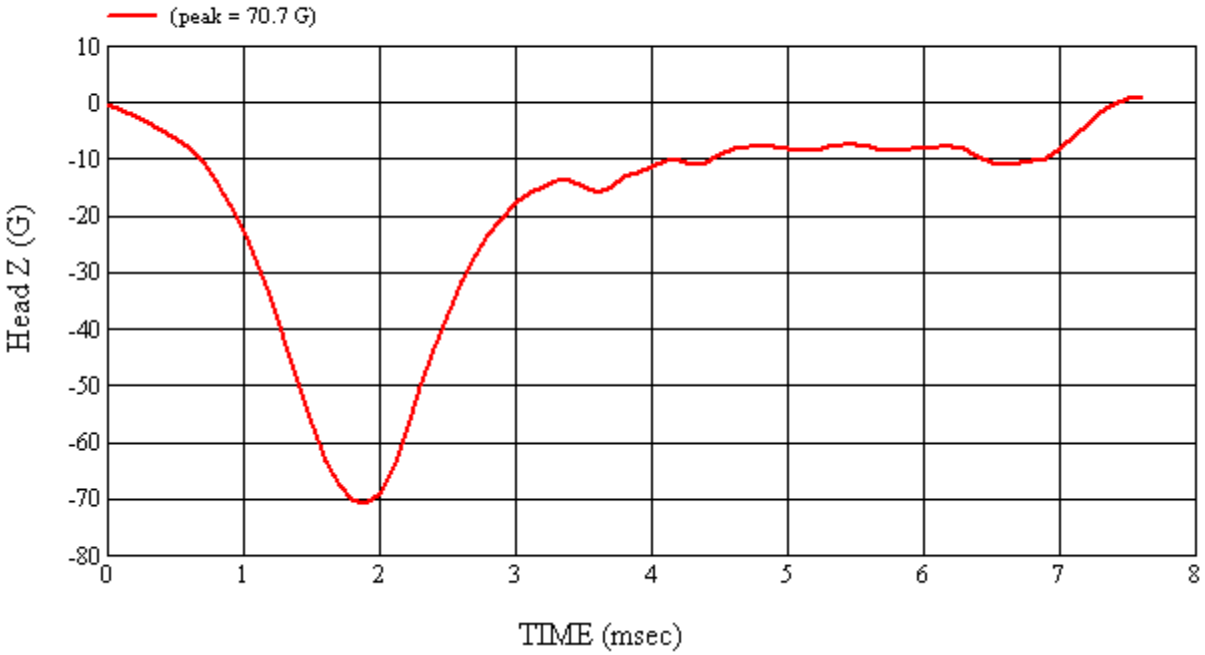
Head 037 (Post) Calibration #H37042



Head 037 (Post) Calibration #H37042



Head 037 (Post) Calibration #H37042



Head 037 (Post) Calibration #H37042

4-5 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

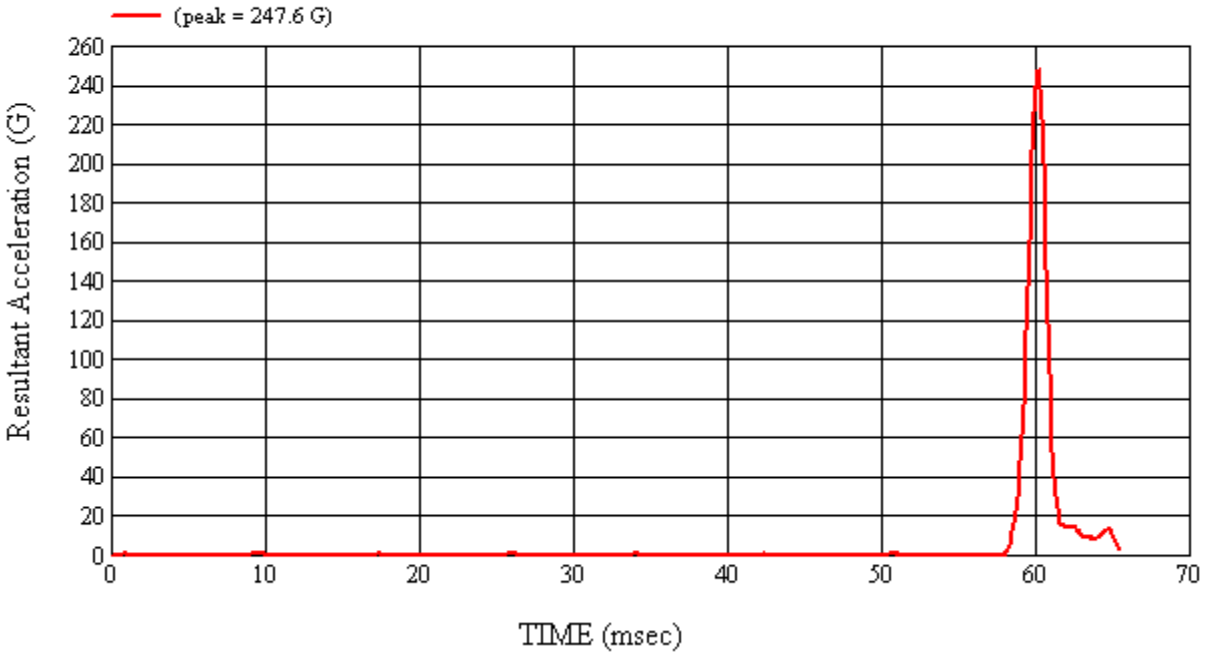
HEADFORM SERIAL NUMBER: 038	CALIBRATION DATE: 7/13/2011 CALIBRATION TIME: 6:38:21 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	23.1
Relative Humidity	10% to 70%	49.2
Peak Resultant Acceleration	225 G's to 275 G's	247.6
Peak Lateral Acceleration	15 G's Maximum	12.2
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	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

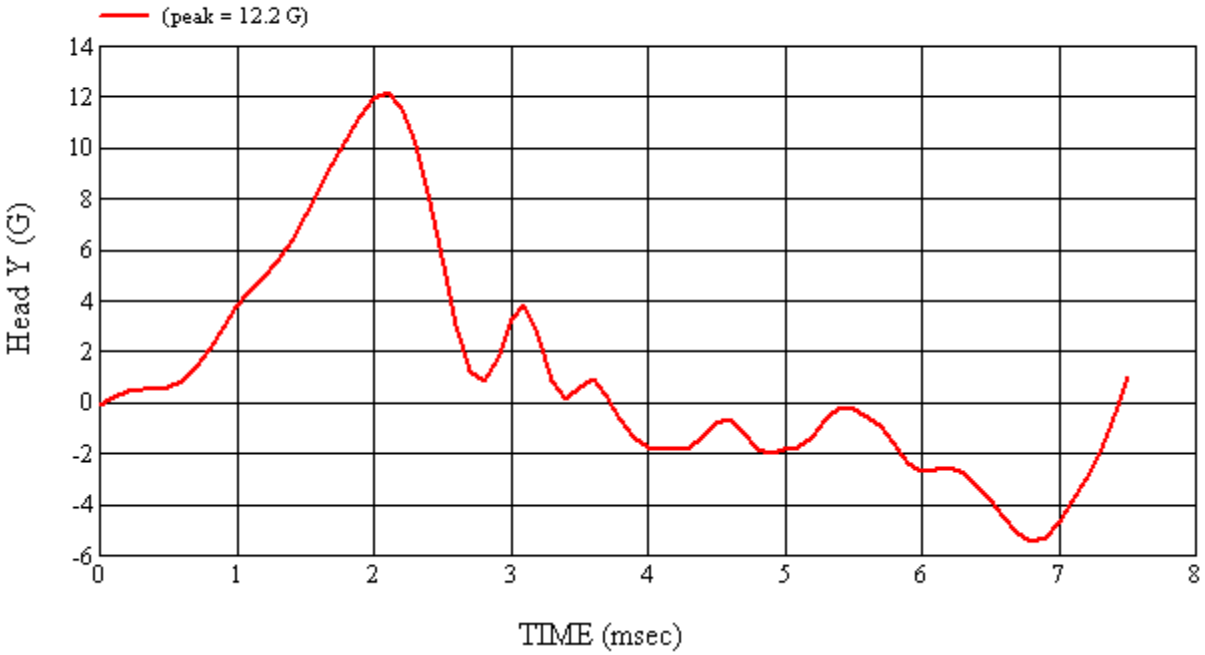
REMARKS:

RECORDED BY: _____ DATE: 7/13/2011

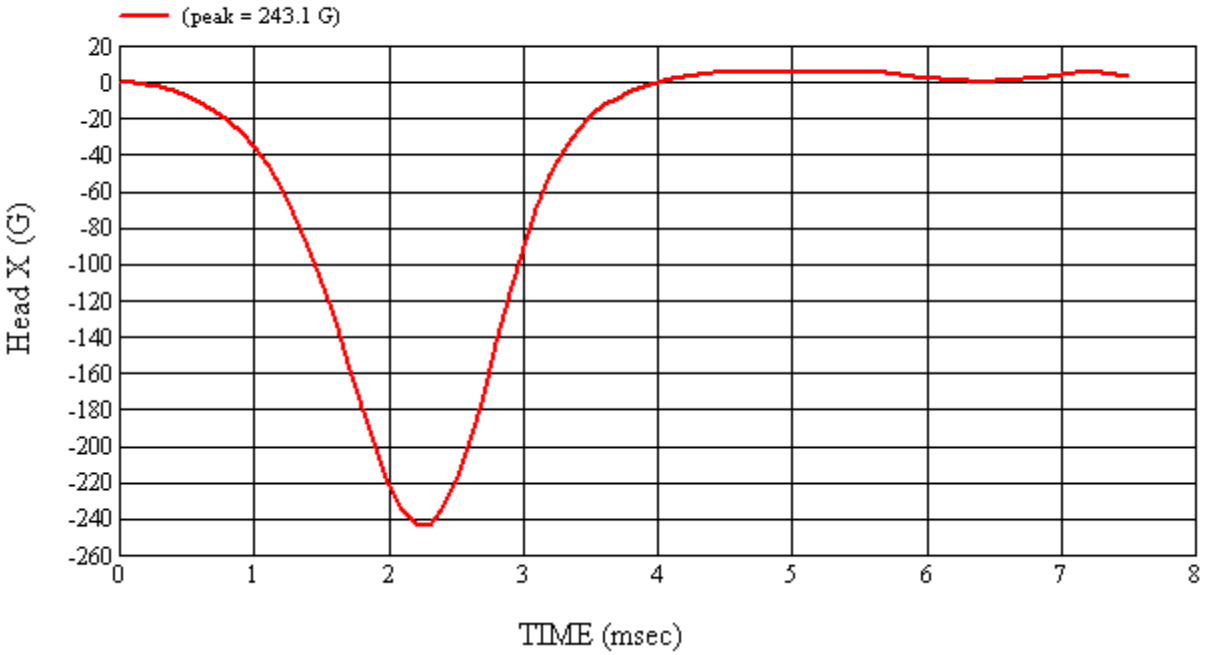
APPROVED BY: _____



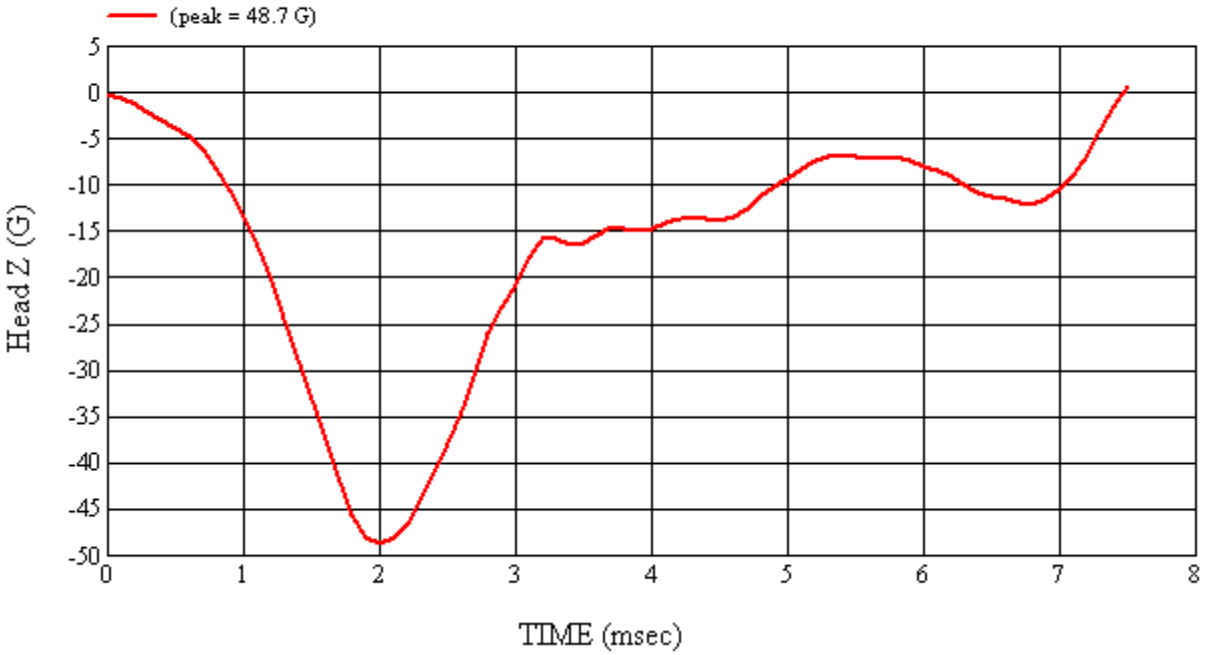
Head 038 (Pre) Calibration #H38041



Head 038 (Pre) Calibration #H38041



Head 038 (Pre) Calibration #H38041



Head 038 (Pre) Calibration #H38041

4-6 Post-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: 038	CALIBRATION DATE: 7/18/2011 CALIBRATION TIME: 2:42:53 PM	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
Weight	9.90 to 10.10 lbs.	9.90
Temperature	19° C to 26° C	25.5
Relative Humidity	10% to 70%	60.6
Peak Resultant Acceleration	225 G's to 275 G's	263.6
Peak Lateral Acceleration	15 G's Maximum	12.3
Unimodal Acceleration Curve	YES	YES

FMH INSTRUMENTATION

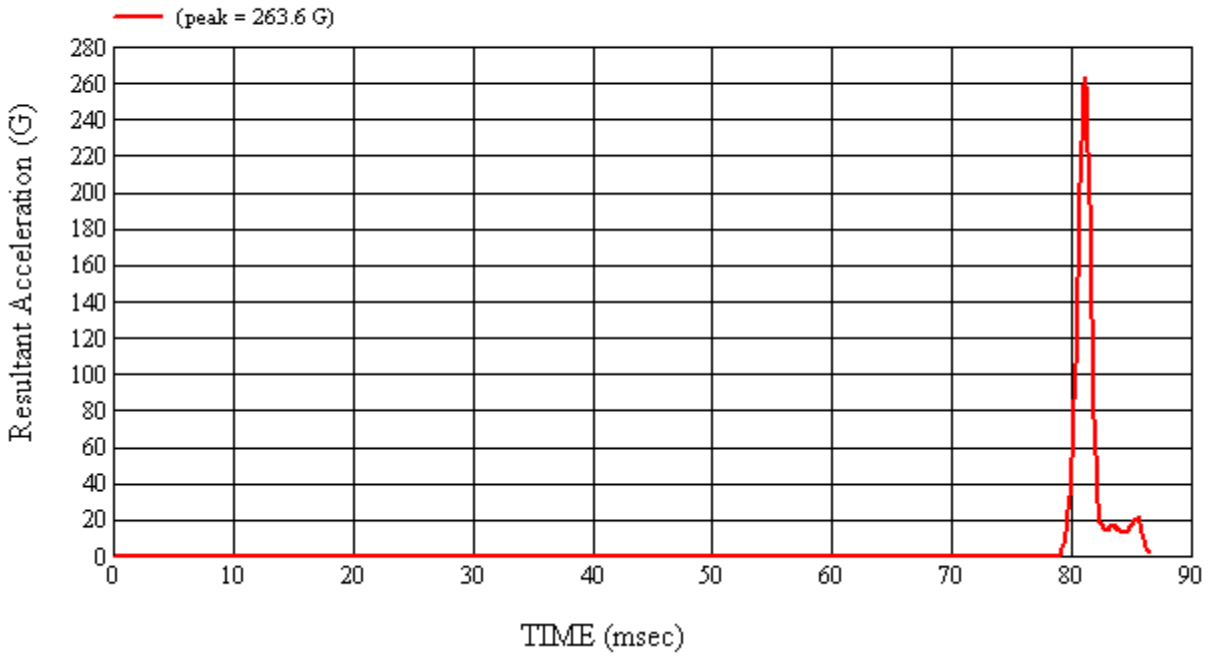
HEAD ACCELEROMETERS

Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	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

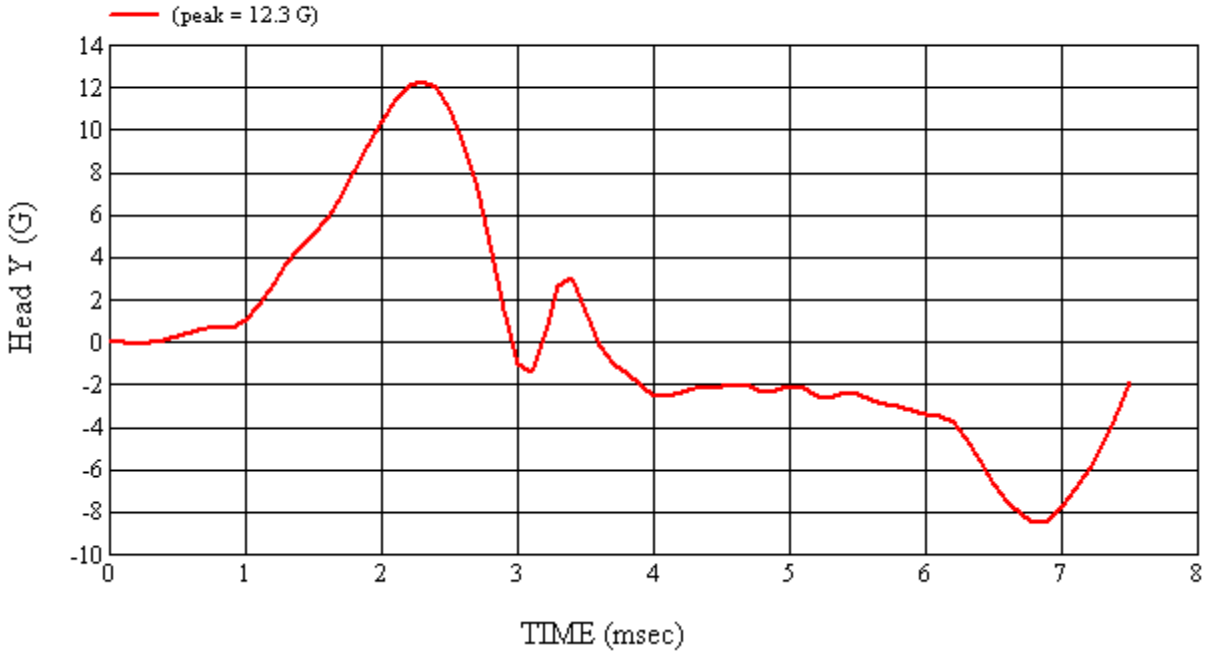
REMARKS:

RECORDED BY: _____ DATE: __7/18/2011____

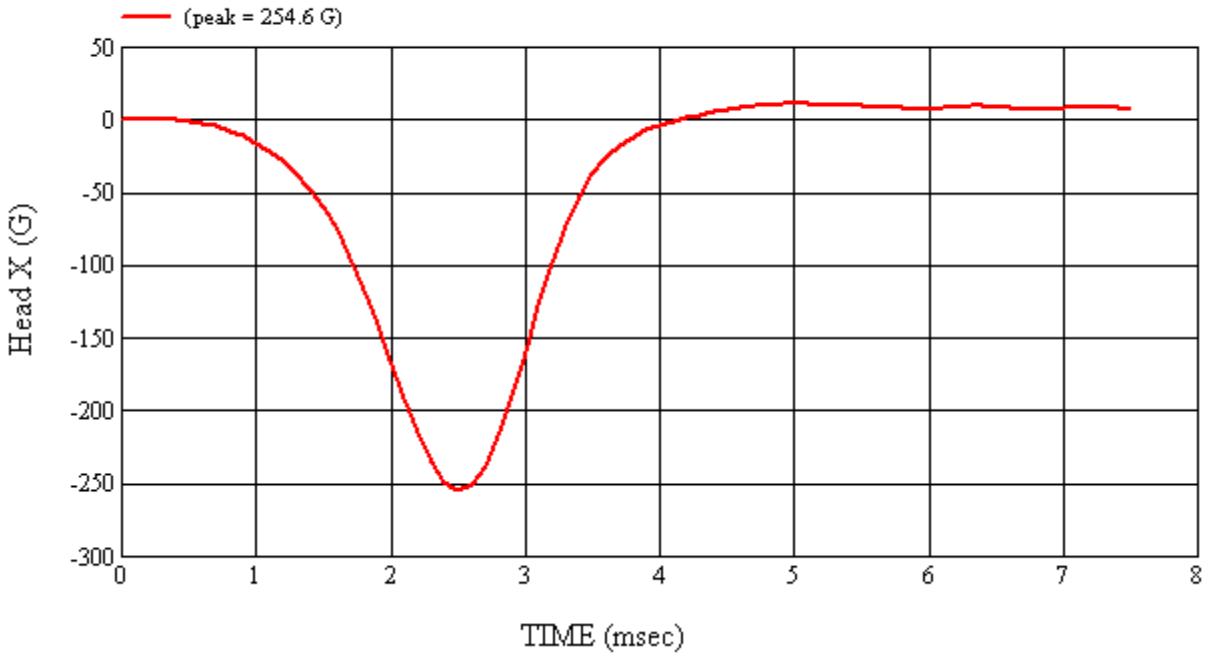
APPROVED BY: _____



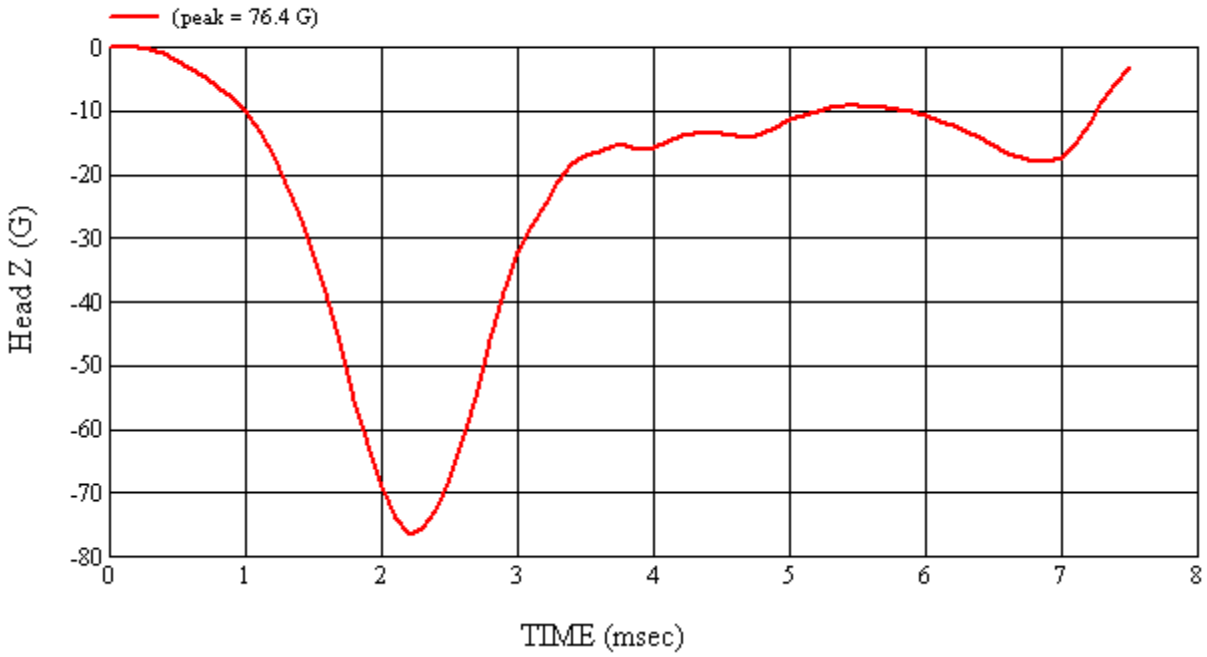
Head 038 (Post) Calibration #H38042



Head 038 (Post) Calibration #H38042



Head 038 (Post) Calibration #H38042



Head 038 (Post) Calibration #H38042

5.0 PHOTOGRAPHS

As Delivered – Left Side View

As Delivered – Right Side View

As Delivered – ¾ Front View From Left Side

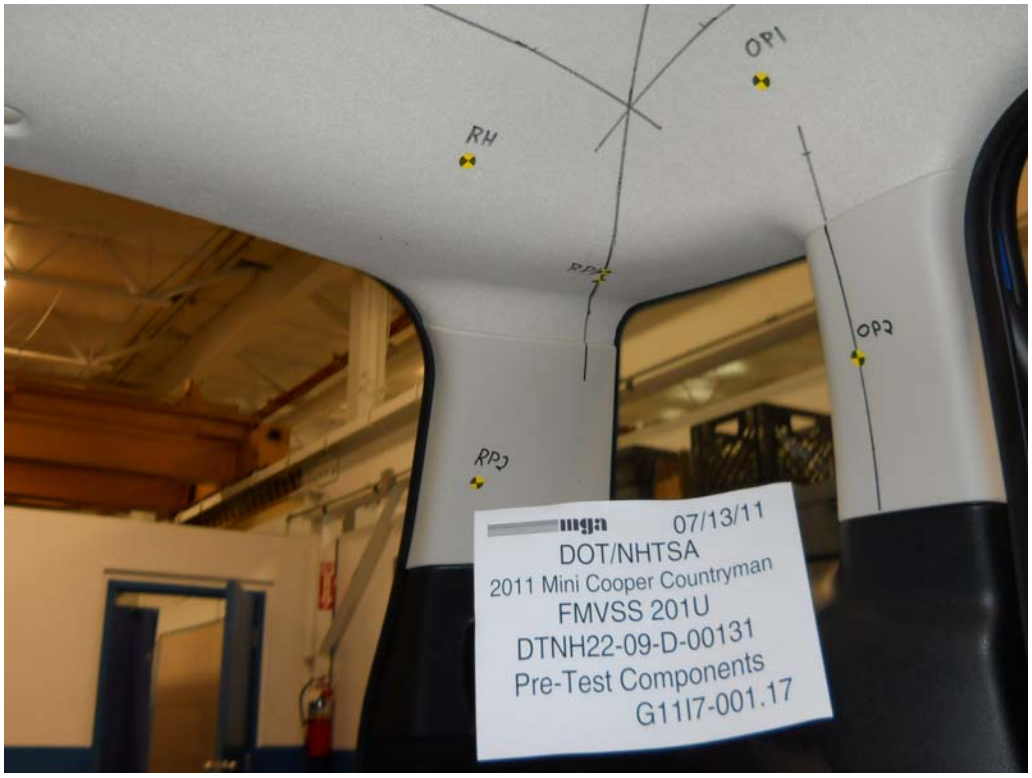
As Delivered – ¾ Rear View From Right Side

As Delivered – Vehicle's Certification Label

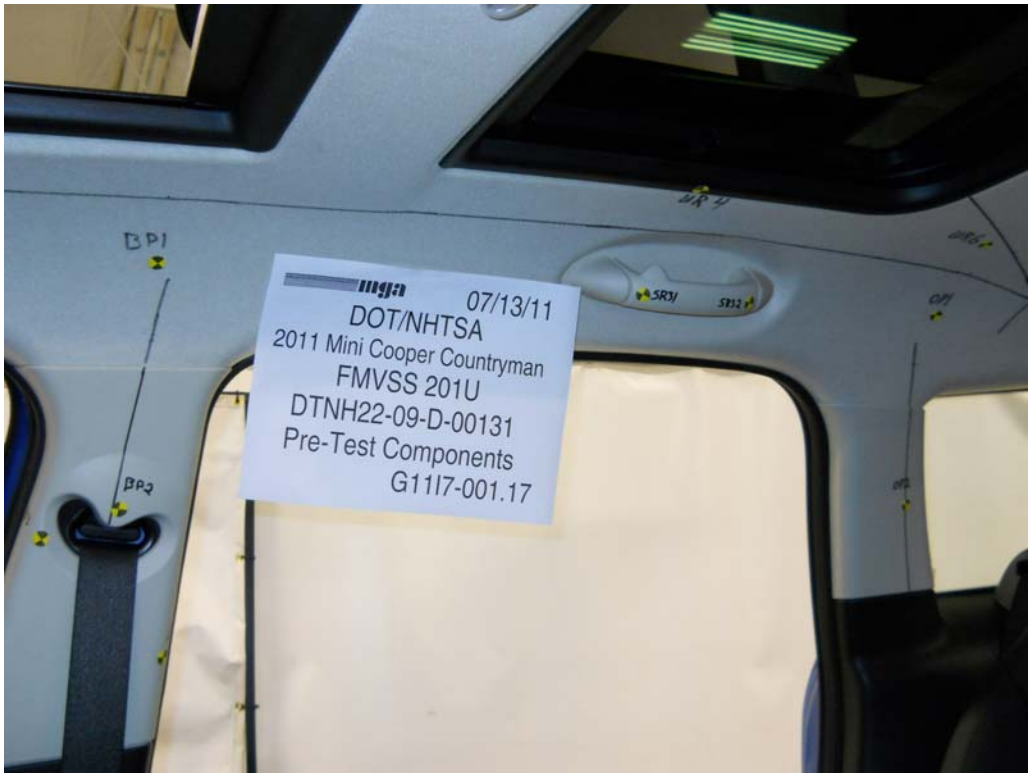
As Delivered – Vehicle's Tire Information Label

Pre-Test Component Photographs


UR5
UR3
SR32
SR31
BP1
BP2
BPH
mga
07/13/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Pre-Test Components
G11I7-001.17


OP1
RH
OP2
RP2
mga
07/13/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Pre-Test Components
G11I7-001.17


OP1
RH
OP2
RP2
07/13/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Pre-Test Components
G11I7-001.17


BP1
BP2
07/13/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Pre-Test Components
G11I7-001.17


UR2
AP1
AP2
AP3
07/13/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Pre-Test Components
G11I7-001.17

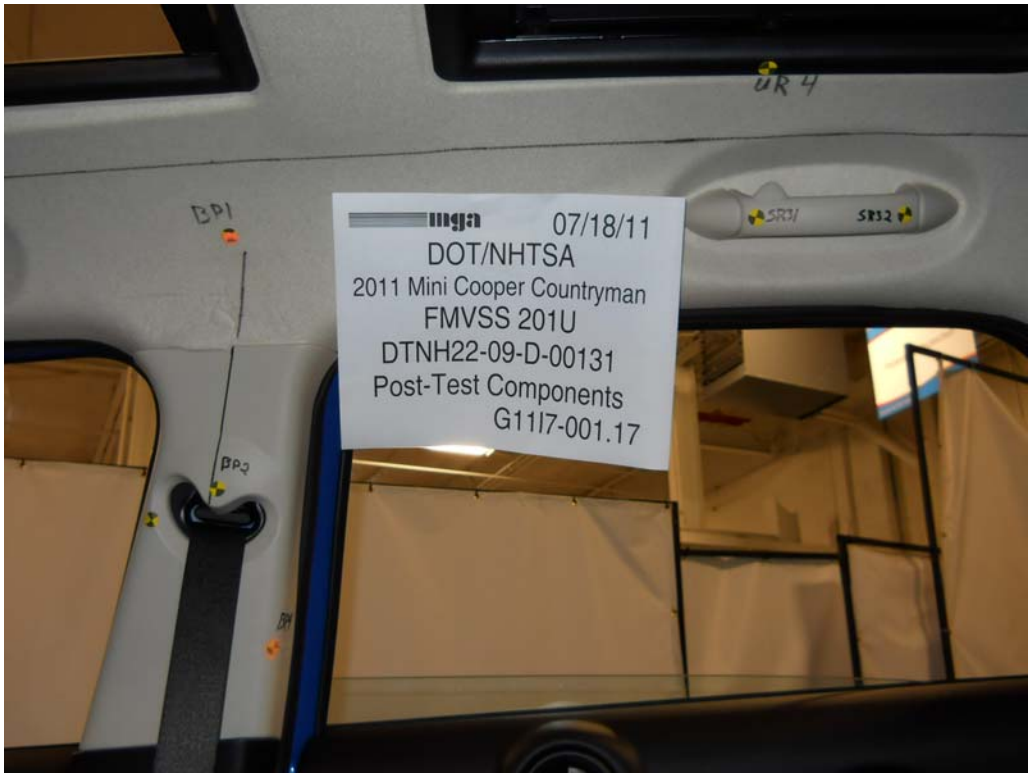

FH2
FH1
AP3
07/13/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Pre-Test Components
G11I7-001.17

Post-Test Component Photographs


UR5
UR3
SR32
BP1
BP2
RH
mga
07/18/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.17


RH
OP1
RP2
OP2
RP2
mga
07/18/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.17

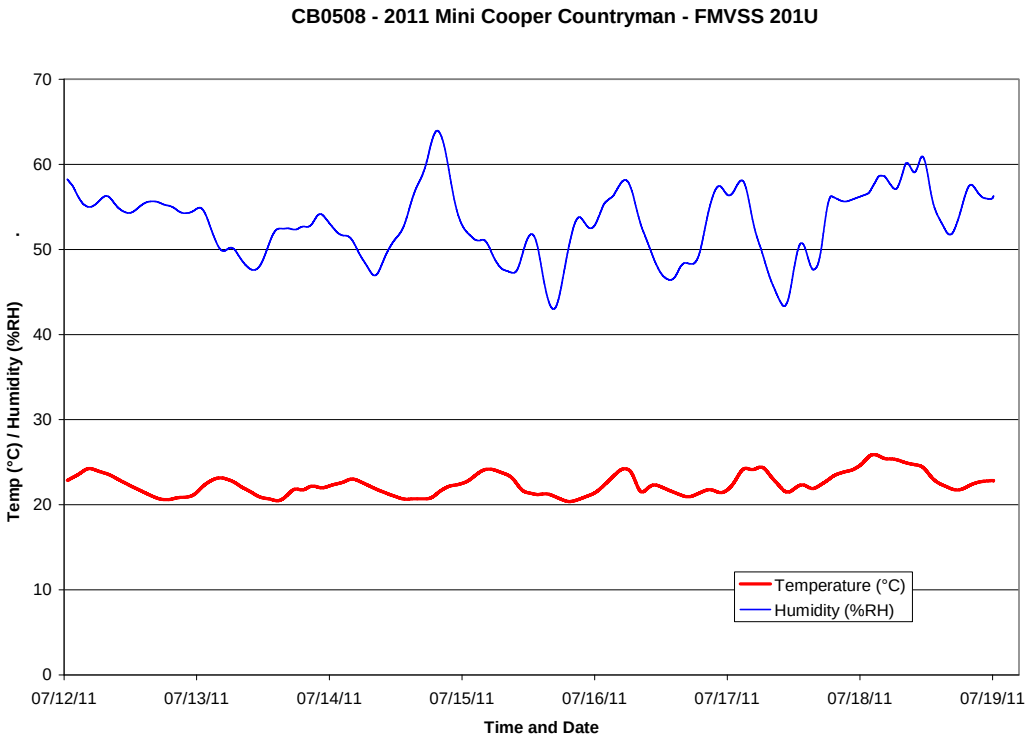

SR31
SR32
UR6
OP1
RH
OP2
RP2
mga
07/18/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.17


UR4
DP1
SR31
SR32
mga
07/18/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.17
DP2
DH


UR2
SR2
FW1
AP2
mga
07/18/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.17


UR2
SR2
AP1
AP2
AP3
mga
07/18/11
DOT/NHTSA
2011 Mini Cooper Countryman
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.17

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 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 #:	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 ^{o}F
Humidity:	20 %
Sensitivity (mV/V/G):	0.025819
Calibrated By:	Chris Collins

Signature: Chris Collins

Approved by: Steven A. Kalette

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

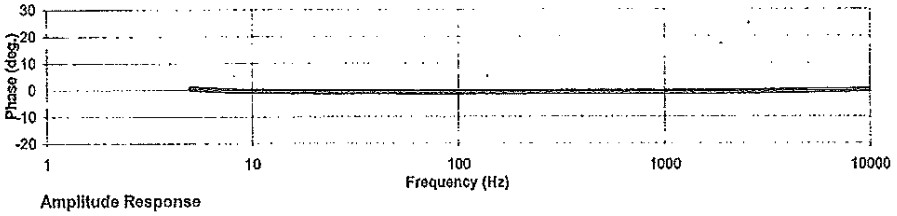
Calibration Data

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

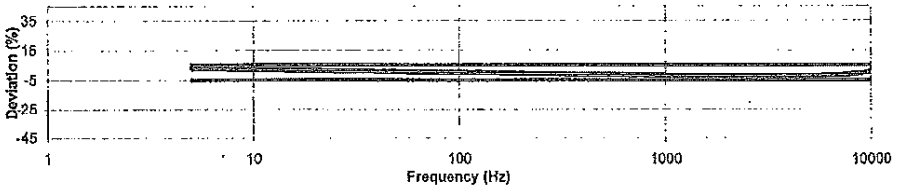
Transducer Specifications

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 permission.

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 (mm/dd/yyyy)

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 3.0 + 5.0X 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

6/28/11

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

LABORATORY ACCREDITATION BUREAU ACCREDITED

f:\control\records\05manufa\partspec\XH08-0495.eps Rev3 RevDate: 12/29/10

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: MGA007999
Calibration Date: 1/15/10

Subject Tape Measure
Brand: STANLEY
S/N: TPM 112
Calibration Date: 12/13/10

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

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

Date: 12/13/2010 Performed By: RJ Mill

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 #:
Z52782:1302713914

FLUKE 80I-110S CURRENT CLAMP

SERIAL NUMBER:	N/A
ASSET NUMBER:	Z52782
CUST. ASSET NUM:	MGA00894
PROCEDURE NAME:	Fluke 80i-110S_CAL_5500_JS
PROCEDURE REV:	1.0
CALIBRATED BY:	STEVE HALL
CUSTOMER:	MGA RESEARCH 446 Executive Drive Troy, MI 48083
PRIMARY CONTACT:	BOB MILLER

WORK ORDER: 1302713914

TEST RESULT:	PASS
PERFORMED ON:	4/13/2011
CAL DUE DATE:	4/13/2012
DATA TYPE:	FOUND-LEFT
TEMPERATURE:	21.75 °C
HUMIDITY:	40 %

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).

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

Action Taken: FULL CALIBRATION

REMARKS:

Standards Used

Asset #	Cert#	Description	Cal Date	Due Date
002664	002664:1297426536	VERITEQ 5000A-RH/T RH/TEMPERATURE DATA LOGGER	2/11/2011	2/11/2012
1429	1429:1270554333	HEWLETT PACKARD 3458A MECI MULTIMET.	4/6/2010	4/15/2011
1432	1432:1293714226	FLUKE 5500A CALIBRATOR	12/30/2010	12/30/2011

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

4/18/11

QA approved: MG **Date:** 4-14-11
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: **69158**
Certificate Number: **100817600**
Page: **1 of 1**

Gauge Number: **MGA00081**
Gauge Desc: **0 to 20lb x 0.01lb Digital Scale**
Manufacturer: **Cardinal Detecto**
Model Number: **AP-20**
Serial Number: **E33603-0213**

Customer PO: **N/A**
Last Calibration: **7/29/09**
Calibration Date: **8/17/10**
Next Calibration: **8/17/11**

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 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)
Weight Set	9/3/08	9/3/10	ID# 2463	+/-0.001% of Load

Results:
Tolerance used: ± 0.02lb

Units: lbs **TI Division/Increment:** 0.01 lb

	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	5.00	0.00		5.00	5.00	0.00
26-50% fs	10.00	9.99	-0.01		10.00	9.99	-0.01
51-75% fs	15.00	14.99	-0.01		15.00	14.99	-0.01
76-100% fs	20.00	19.98	-0.02		20.00	19.98	-0.02
1/2 load test	10.00	9.99	-0.01		10.00	9.99	-0.01
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: 78 °F, 51 % RH.
No adjustment required.

Karen Shipley
Calibration Technician

Issued: 8/17/10

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

@ 8/20/10

Sterling Scale Co., Inc.
20950 Boening St.
Southfield, MI 48076

Certificate of Calibration

F410/12-3
Rev. Date 11/23/05

calibration cert. 1448.01

Customer: MGA Research *Cert#* 10-6914 *Temp/Humidity:* ok
Location of Calibration: 2839 Elliot Rd Troy MI 48083
Calibration Date: 7/21/2010 *Due Date:* Jul-11 *Condition of Item:* Fair
Equipment Make: Intercomp *Model:* SW Deluxe *Serial Number* 26032389 *Capacity:* 2200 lb x 1 lb Per weigh pad
8800 lb x 1 lb Scale system total capacity

Applied Test Wt	*Before Adustment*	*Tolerance*	*In-Tolerance Y/N*	*After Adjustment*	*In-Tolerance Y/N*	*Unc*	
10 lb	9 lb	1 lb	y	n/a	y	0.002 lb	Right Rear Pad
100 lb	100 lb	1 lb	y	n/a	y	0.11 lb	
1000 lb	1000 lb	2 lb	y	n/a	y	0.14 lb	
10 lb	10 lb	1 lb	y	n/a	y	0.002 lb	Right Front Pad
100 lb	100 lb	1 lb	y	n/a	y	0.11 lb	
1000 lb	999 lb	2 lb	y	n/a	y	0.14 lb	

shift test
n/a

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

Tests performed: ☑ Repeatability ☑ Linearity ☐ Sensitivity ☑ Discrimination

Technician COMMENTS/ weights used: This scale is a wheel weigh system, there are a total of 4 wheel pads. Each pad has a capacity of 2200lb. A lb. All 4 pads together have a total capacity of 8800 lb. Scale passes tests sn on file

Page 2 of 2

☑ Scale Certified ☐ Scale Rejected

Sterling Scale Service Rep: E.Denny Date: 7/21/2010 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.
Test numbers on file. 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
This report shall not be reproduced, except in full without approval of the laboratory
Tolerances followed are maintenance/acceptance per HB 44 or as detremined by the customer
Sterling Scale does not warranty calibration.