

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

**TOYOTA MOTOR CORPORATION
2006 Toyota Highlander, 2WD 4-Door MPV
NHTSA No. C65101**

**MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083**



**Test Dates: July 19-21, 2006
Report Date: September 25, 2006**

FINAL REPORT

PREPARED FOR:

**U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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1/14/2007

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 201UI-MGA-06-03	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of FMVSS 201 Compliance Testing of a 2006 Toyota Highlander, 2WD 4-Door MPV, NHTSA No. C65101		5. Report Date September 25, 2006	
		6. Performing Organization Code MGA	
7. Author(s) Helen A. Kaleto, Project Manager Matt Kerr, Project Engineer		8. Performing Organization Report No. 201UI-MGA-06-03	
9. Performing Organization Name and Address MGA Research Corporation 446 Executive Drive Troy, Michigan 48083		10. Work Unit No.	
		11. Contract or Grant No. DTNH22-04-C-11027	
12. Sponsoring Agency Name and Address U.S. Department Of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance (NVS-220) 400 7 th Street, S.W., Room 6111 Washington, D.C. 20590		13. Type of Report and Period Covered Final Test Report	
		14. Sponsoring Agency Code NVS-220	
15. Supplementary Notes			
16. Abstract A compliance test series was conducted on the subject 2006 Toyota Highlander, 2WD 4-Door MPV, NHTSA No. C65101, 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 19-21, 2006. Test failures identified were as follows: None The data recorded indicates that the 2006 Toyota Highlander, 4-Door 2WD MPV, tested appears to comply with the upper interior requirements of FMVSS 201.			
17. Key Words Compliance Testing Safety Engineering FMVSS 201UI 2006 Toyota Highlander, 2WD 4-Door MPV		18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division, Mail Code: NPO-410 400 Seventh Street, SW Washington, D.C. 20590 Telephone No. (202) 366-4946	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 182	22. Price N/A

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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 2006 Toyota Highlander, 2WD 4-Door MPV, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted during July 19-21, 2006 on a 2006 Toyota Highlander, 2WD 4-Door MPV, manufactured by Toyota Motor Corporation.

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 July 1, 2005.

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 July 1, 2005.

2.0 COMPLIANCE TEST DATA SUMMARY

The 2006 Toyota Highlander, 2WD 4-Door MPV, was equipped with A, B, Other (O), and rear-pillars, an adjustable seat belt anchorage on each B-pillar, a non-adjustable seat belt anchorage on each O-pillar, a grab handle located on the side rail above the front driver and passenger doors, and an overhead console located in the center of 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 Toyota. The twelve (12) targets chosen were:

AP1	BP1	OP1	UR5 (OP1)
AP2	BP2	SR1	UR3 (SR3-3)
AP3	BP3	UR2 (BP1)	UR6 (RC)

The 2006 Toyota Highlander, 2WD 4-Door MPV, tested appears to comply with the performance criteria for FMVSS 201U. 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: 2006 Toyota Highlander, 2WD 4-Door MPV

VEH. NHTSA NO.: C65101 VIN: JTEGD21AX60140034 COLOR: Gold

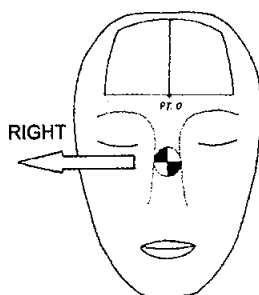
VEH. BUILD DATE: November, 2005 TEST DATES: July 19-21, 2006

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Matt Kerr, Bryan Hood

TARGET	VEHICLE SIDE	HORIZONTAL ANGLE (deg)	VERTICAL ANGLE (deg)	VELOCITY (kph)	HIC(d)	FMH HIC	IMPACT ON FMH (mm)	
							Above	Left/Right
AP1	Right	111	16	23.1	416	331	12	12 Left
AP2	Left	200	46	24.0	762	789	10	5 Left
AP3	Right	158	44	24.2	790	826	12	12 Left
BP1	Right	90	15	23.8	678	679	74	0
BP2	Left	270	4	24.1	562	524	15	3 Left
BP3	Right	86	-5	23.9	542	498	10	0
OP1	Left	270	3	23.7	525	475	25	10 Left
SR1	Left	270	35	24.2	841	894	47	0
UR2 (BP1)	Left	270	50	23.3	653	646	22	6 Left
UR5 (OP1)	Right	90	50	23.8	438	360	22	3 Left
UR3 (SR3-3)	Left	270	50	24.0	630	614	23	3 Left
UR6 (RC)	Left	270	50	24.2	716	729	23	3 Left

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



POST TEST COMMENTS:

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

AP1 Right: Headliner deformation.

AP2 Left: The A-pillar dislodged.

SR1 Left: Headliner deformation.

UR5 (OP1) Right: Headliner deformation.

UR3 (SR3-3) Left: The headliner creased.

REMARKS:

The targets listed were impacted in the following order:

Left: AP2, SR1, BP2, UR2 (BP1), OP1, UR3 (SR3-3), UR6 (RC)

Right: AP3, AP1, BP3, BP1, UR5 (OP1)

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

RECORDED BY: Matt Kerr

DATE: July 21, 2006

APPROVED BY: Helen A. Kaleto

TABLE 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Toyota Highlander, 2WD 4-Door MPV

VEH. NHTSA NO.: C65101 VIN: JTEGD21AX60140034 COLOR: Gold

VEH. BUILD DATE: November, 2005 TEST DATES: July 19-21, 2006

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Matt Kerr, Bryan Hood

INTERIOR TRIM INFORMATION: A, B, O, and rear-pillars, an adjustable seat belt anchorage on each B-pillar, a non-adjustable seat belt anchorage on each O-pillar, a grab handle located on the side rail above the front driver and passenger doors, and an overhead console located in the center of the front upper roof.

SUNROOF INFORMATION:

Installed: Yes X No
Operation: Electric Manual

SIDE RAIL CURTAIN AIRBAG INFORMATION:

Installed: Yes X No

ROLL-BAR INFORMATION:

Installed: Yes X No
Padded: Yes X No
Braces: Yes X No

GENERAL INFORMATION:

Date Received: May 10, 2006; Odometer Reading: 28 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Toyota Motor CorporationDate of Manufacture: November 2005; VIN: JTEGD21AX60140034GVWR: 2430 kg; GAWR FRONT: 1300 kg;GAWR REAR: 1340 kg

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 210 kpa REAR: 210 kpaRecommended Tire Size: P225/70R16

Recommended Cold Tire Pressure:

FRONT: 210 kpa REAR: 210 kpaSize of Tire on Test Vehicle: P225/70R16Type of Spare Tire: P225/70R16 Saver: ; Standard X

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench ; Bucket X; Split Bench Number of Occupants: Front 2; Rear 3; TOTAL 5

VEHICLE CAPACITY WEIGHT:

Vehicle Capacity Weight (VCW) = 390 kgNo. of Occupants x 68 kg = 340 kgRated Cargo/Luggage Weight (RCLW) = 50 kg (difference)

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

Right Front = 436.5 kg Right Rear = 354.0 kgLeft Front = 468.5 kg Left Rear = 343.0 kgTOTAL FRONT = 905.0 kg TOTAL REAR = 697.0 kg% Total Weight = 56.5 % % Total Weight = 43.5 %TOTAL DELIVERED WEIGHT = 1602.0 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 1602.0 kg
 Max. Test Cargo/Luggage Weight = 50.0 kg
 Target Test Weight = 1652.0 kg

WEIGHT OF TEST VEHICLE FULLY LOADED:

Right Front =	<u>435.5</u> kg	Right Rear =	<u>379.5</u> kg
Left Front =	<u>468.5</u> kg	Left Rear =	<u>368.0</u> kg
TOTAL FRONT =	<u>904.0</u> kg	TOTAL REAR =	<u>747.5</u> kg
% Total Weight =	<u>54.7</u> %	% Total Weight =	<u>45.3</u> %

TOTAL TEST WEIGHT = 1651.5 kg

Weight of ballast secured in vehicle's cargo area = 50.0 kg

TEST VEHICLE ATTITUDE:

AS DELIVERED: Right Front 817 mm; Left Front 803 mm;
 Right Rear 820 mm; Left Rear 813 mm;
 Pitch Angle at Right Door Sill = 0.1 Rear is higher
 Pitch Angle at Left Door Sill = 0.3 Rear is higher
 Roll Angle at Front Bumper = 0.0
 Roll Angle at Rear Bumper = 0.3 Right-side is higher

FULLY LOADED: Right Front 817 mm; Left Front 803 mm;
 Right Rear 812 mm; Left Rear 808 mm;
 Pitch Angle at Right Door Sill = 0.1 Front is higher
 Pitch Angle at Left Door Sill = 0.1 Rear is higher
 Roll Angle at Front Bumper = 0.0
 Roll Angle at Rear Bumper = 0.3 Right-side is higher

AS TARGETED: Right Front 981 mm; Left Front 973 mm;
Right Rear 986 mm; Left Rear 971 mm;
Pitch Angle at Right Door Sill = 0.0
Pitch Angle at Left Door Sill = 0.3 Rear is higher
Roll Angle at Front Bumper = 0.0
Roll Angle at Rear Bumper = 0.4 Right-side is higher

AS TESTED ON RIGHT SIDE:

Pitch Angle at Right Door Sill = 0.1 Front is higher
Pitch Angle at Left Door Sill = 0.2 Rear is higher
Roll Angle at Front Bumper = 0.0
Roll Angle at Rear Bumper = 0.3 Right-side is higher

AS TESTED ON LEFT SIDE:

Pitch Angle at Right Door Sill = 0.0
Pitch Angle at Left Door Sill = 0.3 Rear is higher
Roll Angle at Front Bumper = 0.0
Roll Angle at Rear Bumper = 0.4 Right-side is higher

VEHICLE WHEELBASE = 2700 mm

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

RECORDED BY: Matt Kerr

DATE: July 14, 2006

APPROVED BY: Helen A. Kaleto

TABLE 2-3
HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Toyota Highlander, 2WD 4-Door MPV

VEH. NHTSA NO.: C65101 VIN: JTEGD21AX60140034 COLOR: Gold

VEH. BUILD DATE: November, 2005 TEST DATES: July 19-21, 2006

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Matt Kerr, Bryan Hood

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

	HORIZONTAL ANGLE SPECIFIED RANGE	MINIMUM HORIZONTAL ANGLE	MAXIMUM HORIZONTAL ANGLE
A-PILLAR	L 195°-255°	L 199.6°	L 249.4°
	R 105°-165°	R 110.4°	R 158.5°
B-PILLAR	L 195°-345°	L 199.5°	L 276.0°
	R 15°-165°	R 85.3°	R 161.3°

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: Matt Kerr

DATE: July 14, 2006

APPROVED BY: Helen A. Kalet

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Toyota Highlander, 2WD 4-Door MPV

VEH. NHTSA NO.: C65101 VIN: JTEGD21AX60140034 COLOR: Gold

VEH. BUILD DATE: November, 2005 TEST DATES: July 19-21, 2006

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Matt Kerr, Bryan Hood

VERTICAL IMPACT ANGLE RANGES

		VERTICAL ANGLE SPECIFIED RANGE		MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
FRONT HEADER	FH1	L	0°-50°	L 0°	L 50°
		R	0°-50°	R 0°	R 50°
	FH2	L	0°-50°	L 0°	L 50°
		R	0°-50°	R 0°	R 50°
SIDE RAIL	SR1	L	0°-50°	L 0°	L 35°
		R	0°-50°	R 0°	R 33°
	SR2A	L	0°-50°	L 0°	L 21°
		R	0°-50°	R 0°	R 21°
	SR2B	L	0°-50°	L 0°	L 36°
		R	0°-50°	R 0°	R 36°
	SR3-1	L	0°-50°	L 0°	L 18°
		R	0°-50°	R 0°	R 18°
	SR3-2	L	0°-50°	L 0°	L 18°
		R	0°-50°	R 0°	R 18°
	SR3-3	L	0°-50°	L 0°	L 33°
		R	0°-50°	R 0°	R 33°
REAR HEADER	RH	L	0°-50°	L 0°	L N/A
		R	0°-50°	R 0°	R N/A

		VERTICAL ANGLE SPECIFIED RANGE	MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
A-PILLAR	AP1	L -5°-50°	L -5°	L 17°
		R -5°-50°	R -5°	R 16°
	AP2	L -5°-50°	L -5°	L 46°
		R -5°-50°	R -5°	R 48°
	AP3	L -5°-50°	L -5°	L 44°
		R -5°-50°	R -5°	R 44°
B-PILLAR	BP1	L -10°-50°	L -10°	L 16°
		R -10°-50°	R -10°	R 15°
	BP2*	L 0°-50°	L 0°	L 4°
		R 0°-50°	R 0°	R 5°
	BP3	L -10°-50°	L -10°	L -5°
		R -10°-50°	R -10°	R -5°
	BP4	L -10°-50°	L -10°	L -7°
		R -10°-50°	R -10°	R -6°
OTHER PILLAR	OP1*	L 0°-50°	L 0°	L 3°
		R 0°-50°	R 0°	R 3°
	OP2	L -10°-50°	L -10°	L 3°
		R -10°-50°	R -10°	R 3°
REAR PILLAR	RP1	L -10°-50°	L -10°	L N/A
		R -10°-50°	R -10°	R N/A
	RP2	L 0°-50°	L -10°	L N/A
		R 0°-50°	R -10°	R N/A
UPPER ROOF 1		0°-50°	0°	49°
UPPER ROOF 2		0°-50°	0°	50°
UPPER ROOF 3		0°-50°	0°	50°
UPPER ROOF 4		0°-50°	0°	50°
UPPER ROOF 5		0°-50°	0°	50°

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

As determined using the Procedures specified in S8.13.4.2. *Targets BP2 and OP1 are seat belt anchorage locations. N/A indicates that Targets RP1, RP2, and RH were exempt from testing per S6.3(b) of FMVSS 201.

RECORDED BY: Matt Kerr

DATE: July 14, 2006

APPROVED BY: Helen A. Kaleto

TABLE 2-5
TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Toyota Highlander, 2WD 4-Door MPV

VEH. NHTSA NO.: C65101 VIN: JTEGD21AX60140034 COLOR: Gold

VEH. BUILD DATE: November, 2005 TEST DATES: July 19-21, 2006

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Matt Kerr, Bryan Hood

Measurement	Description	Left Side	Right Side
M	Seat Fore/Aft Travel (Front seats)	240 mm	240 mm
T°	Horizontal < {CG-F1 (Left Seat) to (Right A-Pillar)}	110.6°	--
A1°	360° - T°	249.4°	--
W°	Horizontal < {CG-2 (Left Seat) to (Left A-Pillar)}	199.6°	--
A2°	A2° = W°	199.6°	--
U°	Horizontal < {CG-2 (Left Seat) to (Left B-Pillar)}	276.0°	--
B1°	B1° = U°	276.0°	--
V°	Horizontal < {CG-R (Left Seat) to (Left B-Pillar)}	199.5°	--
B2°	B2° = V°	199.5°	--
W° (right)	Horizontal < {CG-F2 (Right Seat) to (Right A-Pillar)}	--	158.5°
A1° (right)	A1° (right) = W° (right)	--	158.5°
T ° (right)	Horizontal < {CG-F1 (Right Seat) to (Left A-Pillar)}	--	249.6°
A2° (right)	360°-T° (right)	--	110.4°
V ° (right)	Horizontal < {CG-R (Right Seat) to (Right B-Pillar)}	--	161.3°
B1° (right)	B1° (right) = V° (right)	--	161.3°
U ° (right)	Horizontal < {CG-F2 (Right Seat) to (Right B-Pillar)}	--	85.3°
B2° (right)	B2° (right) = U° (right)	--	85.3°
J	A-Pillar {(Plane 3) - (Plane 5)}	381.3 mm	379.2 mm
J/2	J ÷ 2	190.7 mm	189.6 mm
D1	Upper Roof {(Plane A) - (Plane B)}	2396.0 mm	
D1/2	D1 ÷ 2	1198.0 mm	
D2	Upper Roof {(Plane C) - (Plane D)}	1231.1 mm	

Measurement	Description	Left Side	Right Side
D2/2	$D2 \div 2$	615.6 mm	
.35D1	.35 x D1	838.6 mm	
.35D2	.35 x D2	430.9 mm	
N	B-Pillar {(BPR) - (lowest point on daylight opening forward of B-Pillar)}	487.3 mm	483.3 mm
N/2	B-Pillar {(BP3) - (lowest point on daylight opening forward of B-Pillar)}	243.7 mm	241.7 mm
N/4	B-Pillar {(BP4) - (lowest point on daylight opening forward of B-Pillar)}	121.8 mm	120.8 mm
Q	O-Pillar (Plane 13 – Plane 14)	437.9 mm	441.7 mm
Q/2	Q / 2	219.0 mm	220.9 mm
D	R-Pillar (Point 7 – Point M)	950.0 mm	950.0 mm
3D/7	$3 \times D / 7$	407.1 mm	407.1 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	2395.1	-378.6	1430.1	2397.2	383.4	1436.1
Rear Row	3247.7	-371.8	1445.8	3249.9	380.2	1451.7

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	2397.0	-380.0	1428.0	2397.0	380.0	1428.0
Rear	3250.0	-375.0	1442.0	3250.0	375.0	1442.0

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	Z
CGF1	2315.1	-378.6	2090.1	2317.2	383.4	2096.1
CGF2	2555.1	-378.6	2090.1	2557.2	383.4	2096.1
CGR	3407.7	-371.8	2105.8	3409.9	380.2	2111.7

REFERENCE FOR VEHICLE COORDINATE SYSTEM (measured in millimeters):

Driver door top striker bolt (x, y, z) = 2518.0, -805.3, 1574.9

Driver outboard front seat anchorage (x, y, z) = 2034.4, -601.5, 1148.1

Passenger door top striker bolt (x, y, z) = 2518.0, 805.3, 1574.9

REMARKS:

RECORDED BY: Matt Kerr

DATE: July 14, 2006

APPROVED BY: Helen A. Kaleto

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2006 Toyota Highlander, 2WD 4-Door MPVVEH. NHTSA NO.: C65101 VIN: JTEGD21AX60140034 COLOR: GoldVEH. BUILD DATE: November, 2005 TEST DATES: July 19-21, 2006TEST LABORATORY: MGA Research CorporationOBSERVERS: Matt Kerr, Bryan Hood

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	2078.1	-552.0	2232.5	--	--	Yes	--	--
REL	2105.4	-570.5	2195.2	249	17	--	2	No
AP2	2038.7	-598.1	2145.0	200	46	No	--	Yes
AP3	1872.7	-635.7	2042.8	200	44	No	--	No
A-Pillar Right Side								
AP1	2082.0	-551.4	2235.4	--	--	Yes	--	--
REL	2094.5	571.6	2191.2	111	16	--	2	Yes
AP2	2046.0	596.9	2147.2	158	48	No	--	No
AP3	1869.9	630.9	2048.0	158	44	No	--	Yes
B-Pillar Left Side								
BP1	2623.0	-511.2	2306.9	--	--	Yes	--	--
REL	2622.2	-505.6	1210.4	270	16	--	1	No
BP2	2596.8	-620.2	2048.7	270	4	No	--	Yes
BP3	2578.2	-645.0	2063.3	--	--	Yes	--	--
REL	2552.5	-667.6	2023.5	276	-5	--	2	No
BP4	2655.4	-698.1	1941.7	200	-7	--	--	No
B-Pillar Right Side								
BP1	2619.6	518.2	2301.7	--	--	Yes	--	--
REL	2620.1	513.7	2306.2	90	15	--	1	Yes

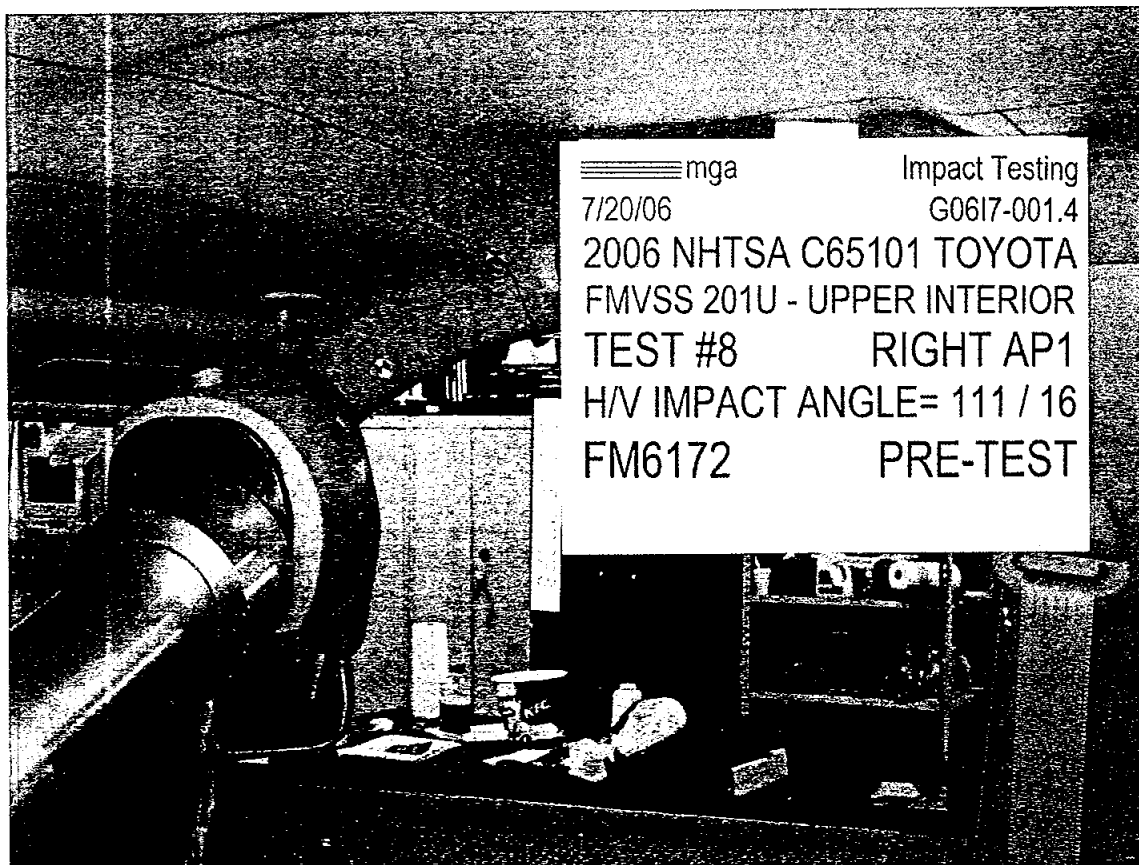
SUMMARY OF TARGETING RESULTS								
Target	Location (mm)			Horizontal Angle (deg)	Vertical Angle (deg)	Relocation (Yes/No)	Extension (# of 25 mm Spheres)	Impact (Yes/No)
	X	y	z					
BP2	2600.1	622.9	2047.3	90	5	No	--	No
BP3	2573.7	648.0	2059.6	--	--	Yes	--	--
REL	2553.6	665.6	2022.1	86	-5	--	1	Yes
BP4	2651.6	700.4	1938.3	161	-6	No	--	No
Other Pillar Left Side								
OPR	3520.9	-501.1	2305.1	--	--	--	--	--
OP1	3536.8	-619.6	2096.7	270	3	No	--	Yes
OP2	3549.8	-624.0	2085.6	270	3	No	--	No
Other Pillar Right Side								
OPR	3520.2	508.6	2303.1	--	--	--	--	--
OP1	3531.0	628.4	2093.9	90	3	No	--	No
OP2	3544.2	634.5	2082.2	90	3	No	--	No
Rear Pillar Left Side								
RP1	4129.4	-518.8	2254.8	Target exempt from testing per S6.3(b).				No
RP2	4043.2	-654.2	2104.1	Target exempt from testing per S6.3(b).				No
Rear Pillar Right Side								
RP1	4131.6	518.5	2260.7	Target exempt from testing per S6.3(b).				No
RP2	4034.6	659.0	2111.2	Target exempt from testing per S6.3(b).				No
Front Header Left Side								
FH1	1995.9	-430.6	2230.9	180	50	No	--	No
FH2	1980.1	-281.2	2236.4	180	50	No	--	No
Front Header Right Side								
FH1	1991.7	432.3	2225.9	180	50	No	--	No
FH2	1975.8	283.3	2232.6	180	50	No	--	No
Side Rail Left Side								
SR1	2228.1	-514.5	2269.2	--	--	Yes	--	--
REL	2211.1	-497.8	2264.6	270	35	--	1	Yes
SR2A	2378.2	-524.2	2295.0	--	--	Yes	--	--
REL	2433.9	-504.9	2252.7	270	21	--	3	No

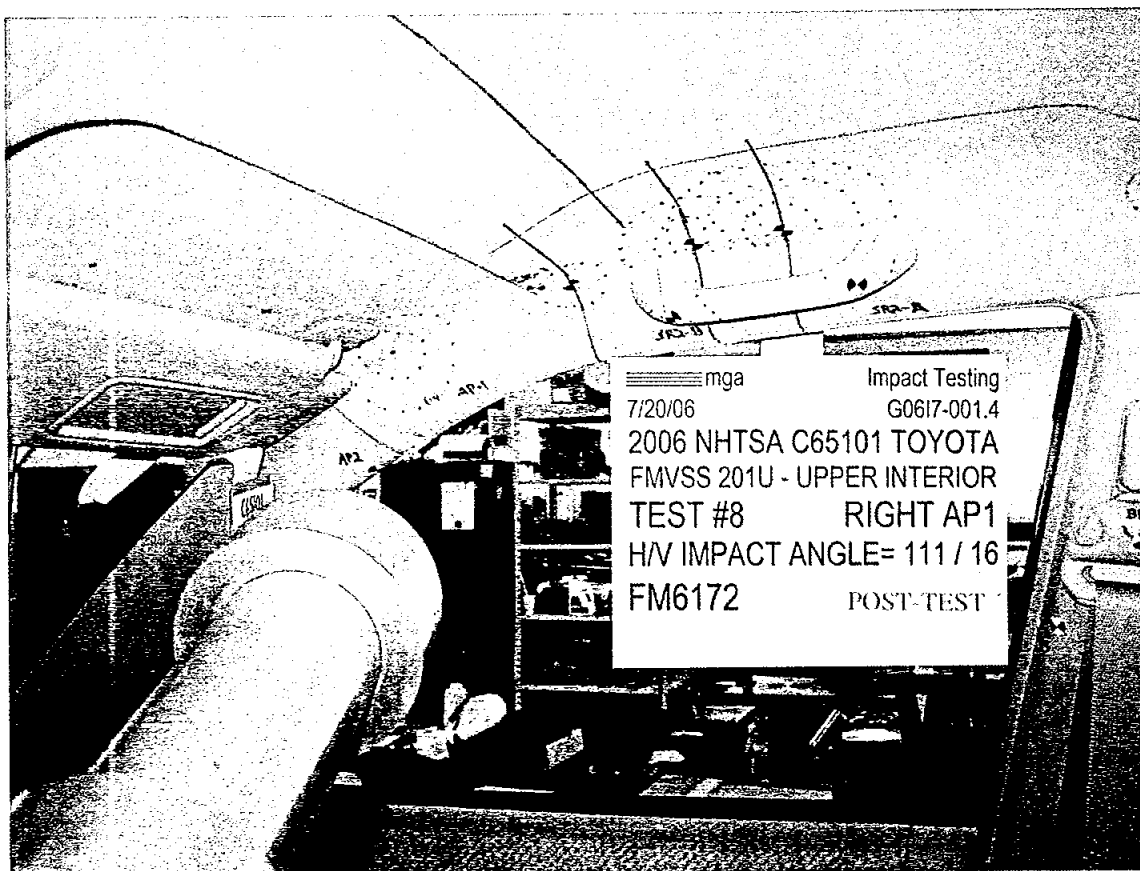
SUMMARY OF TARGETING RESULTS								
Target	Location (mm)			Horizontal Angle (deg)	Vertical Angle (deg)	Relocation (Yes/No)	Extension (# of 25 mm Spheres)	Impact (Yes/No)
	X	y	z					
SR2B	2322.0	-526.5	2289.8	--	--	Yes	--	--
REL	2306.5	-515.8	2237.7	270	36	--	2	No
SR3-1	3046.8	-498.9	2269.1	270	18	No	--	No
SR3-2	3184.0	-497.0	2269.9	270	18	No	--	No
SR3-3	3670.1	-507.9	2297.6	270	33	No	--	No
Side Rail Right Side								
SR1	2231.4	526.0	2265.2	--	--	Yes	--	--
REL	2210.7	508.9	2260.7	90	33	--	1	No
SR2A	2382.4	524.8	2292.7	--	--	Yes	--	--
REL	2432.1	509.3	2249.3	90	21	--	3	No
SR2B	2319.2	525.9	2286.7	--	--	Yes	--	--
REL	2308.5	510.1	2238.7	90	36	--	2	No
SR3-1	3043.7	507.9	2264.7	90	18	No	--	No
SR3-2	3181.8	505.3	2267.9	90	18	No	--	No
SR3-3	3669.3	512.9	2299.2	90	33	No	--	No
Rear Header Left Side								
RH	4160.9	-370.9	2289.0	Target exempt from testing per S6.3(b).				No
Rear Header Right Side								
RH	4162.6	380.9	2286.2	Target exempt from testing per S6.3(b).				No
Upper Roof Left Side								
UR1 (SR1)	2323.9	-360.9	2317.7	270	49	No	--	No
UR2 (BP1)	2621.1	-422.6	2318.4	270	50	No	--	Yes
UR3 (SR3-3)	3669.8	-420.8	2319.5	270	50	No	--	Yes
UR6 (RC)	3843.8	-422.2	2316.4	270	50	No	--	Yes
Upper Roof Right Side								
UR4	2782.1	424.1	2319.7	90	50	No	--	No
UR5 (OP1)	3520.7	424.1	2315.7	90	50	No	--	Yes

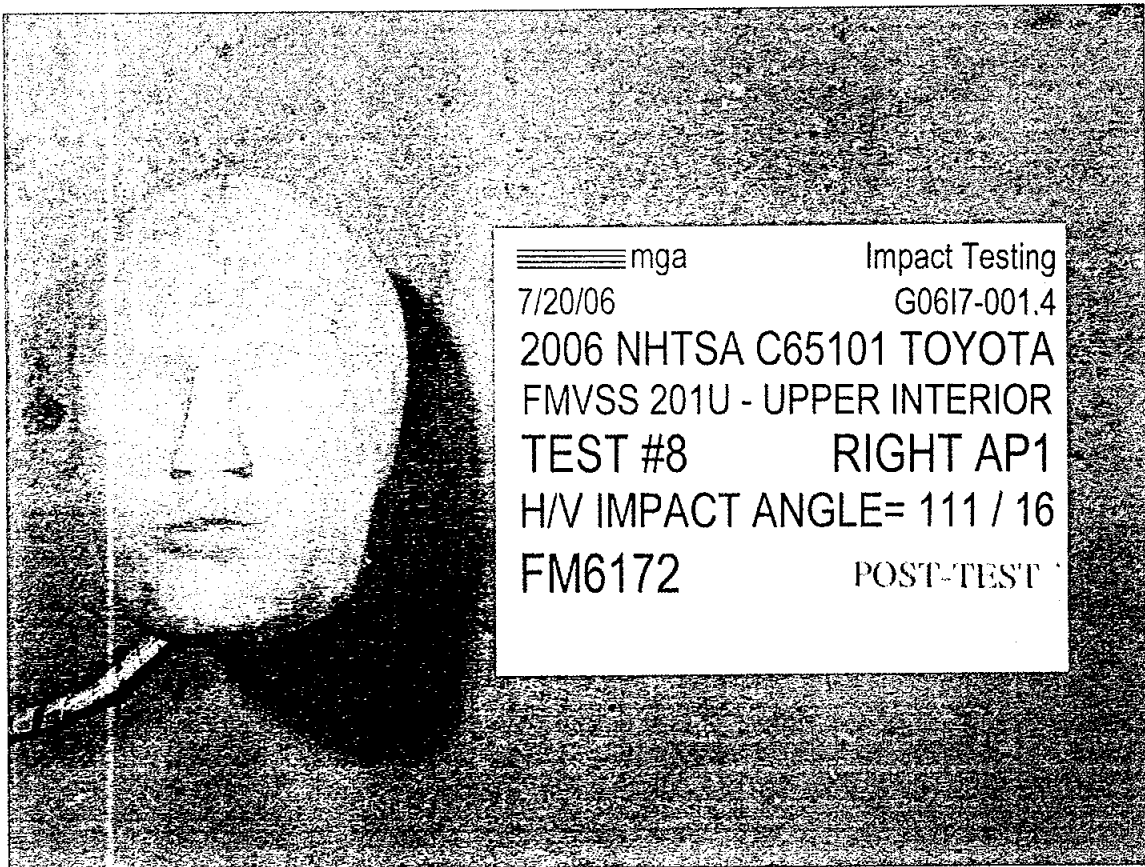
As determined using the Procedures specified in S10.1-10.13.

REMARKS:

RECORDED BY: Matt Kerr DATE: July 14, 2006 APPROVED BY: Helen A. Kaletto







SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0617-001.4 VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#8

Target (Vehicle Side): AP1Right

Temperature:25C

MGA Test Reference No.:FM6172

Humidity:44%

Approach Horizontal Angles:111°

Time of Test:12:15 PM

Approach Vertical Angles:16°

FMH Serial No:[039]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
416	331	9.5	23.1	12	12 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J13753	-103.6	1.54	1.54
Y	6	J22700	94.4	1.53	1.54
Z	7	J32734	95.5	1.45	1.45

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

Headliner deformation.

Recorded By: Matt Kerr Approved By*: Aileen A. Kalata Date: 7/20/06
 *Only necessary for NHTSA (Government) Compliance testing.

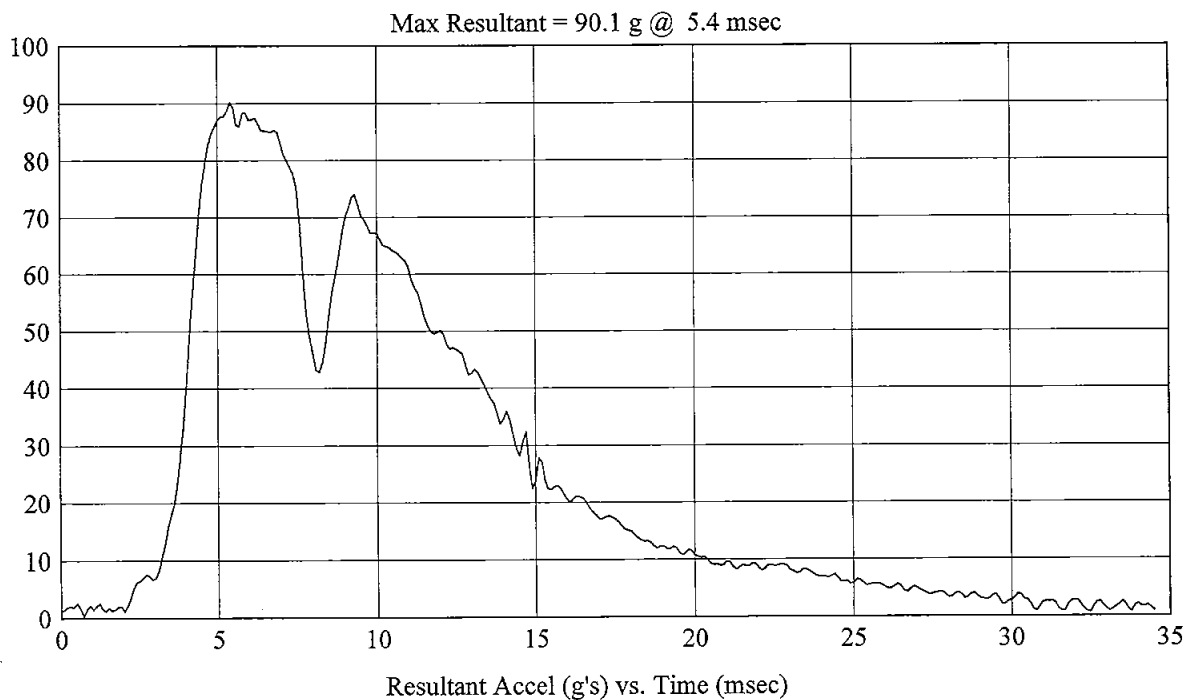
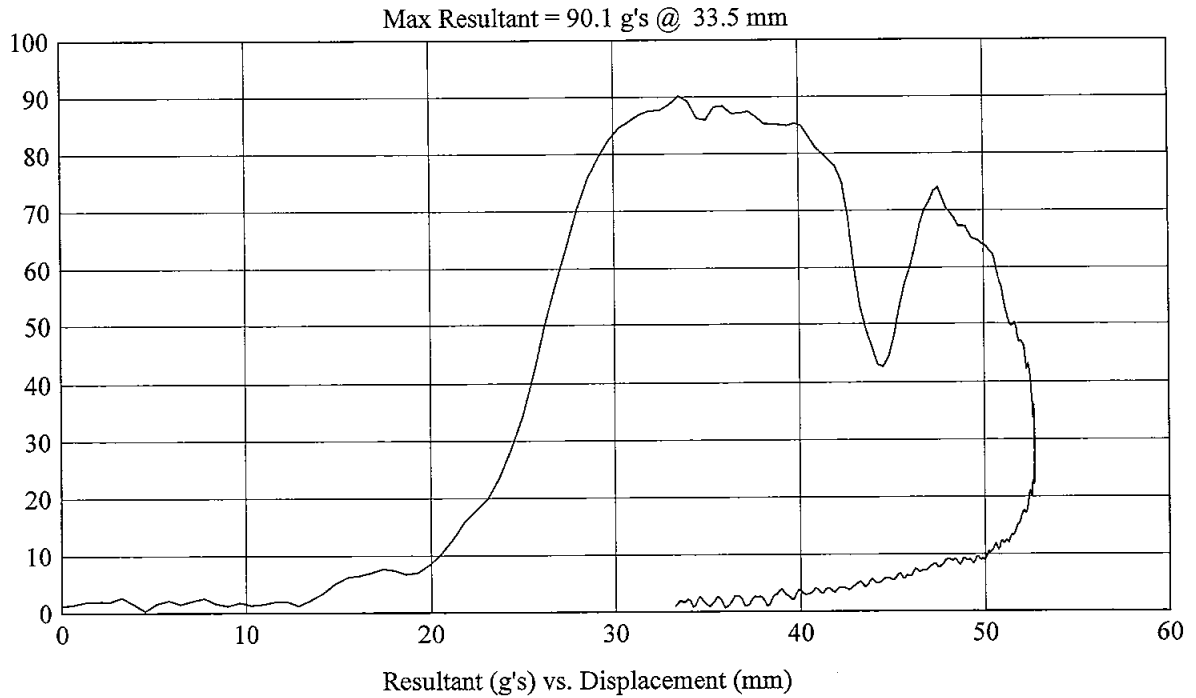
FMH
G06I7-001.4

Customer: NHTSA
Test # 8
FM6172
Additional Desc: N/A

Vehicle Program : Toyota
Test Date: 7/20/06

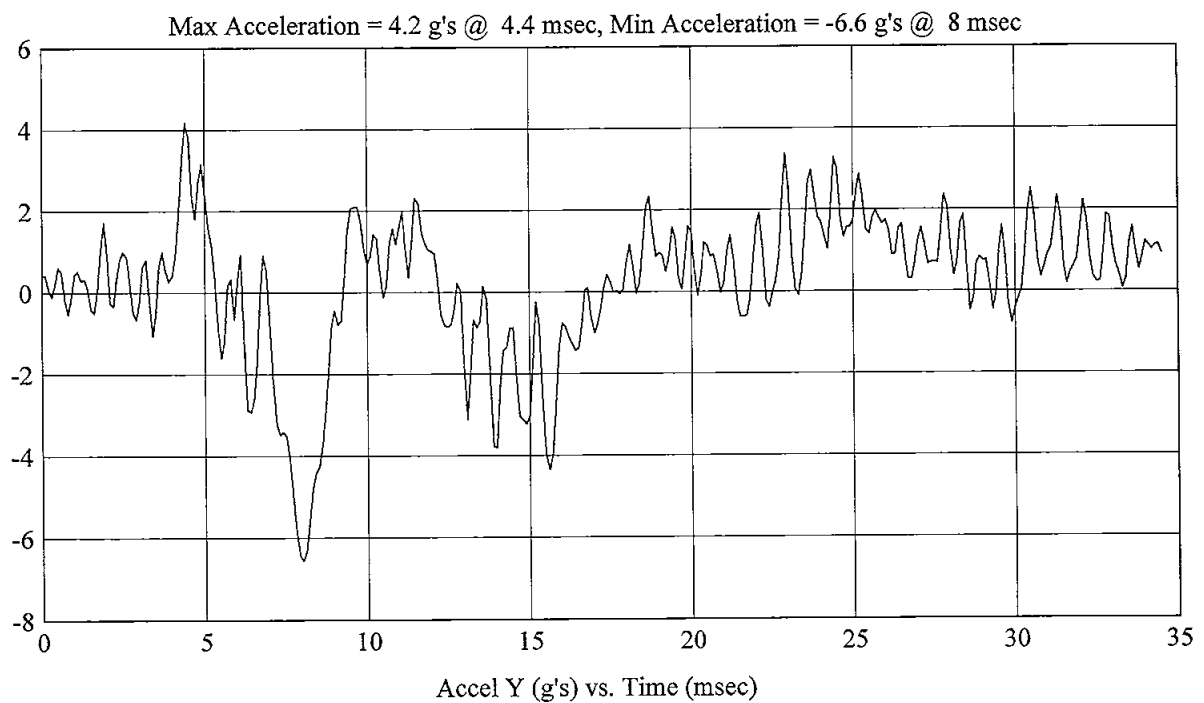
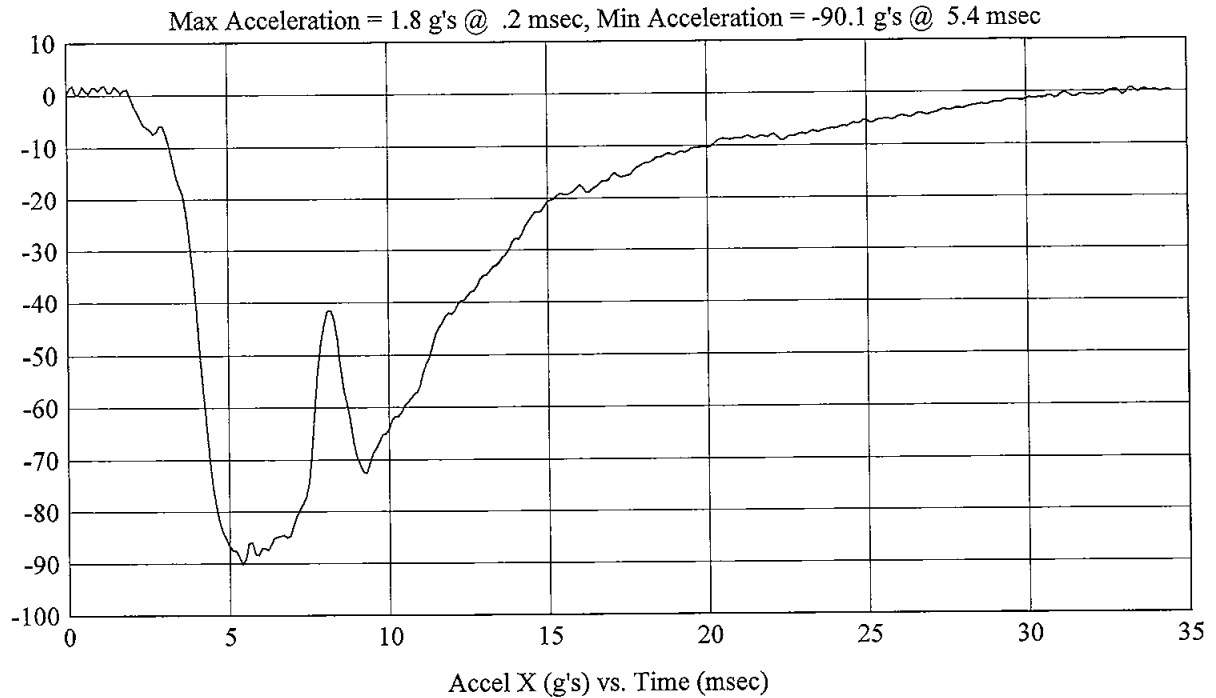
Model Year: 2006
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 111/16

HIC(d) = 416, HIC = 331, Delta T = 9.5 msec



FMH
G06I7-001.4Customer: NHTSA
Test # 8
FM6172
Additional Desc: N/AVehicle Program : Toyota
Test Date: 7/20/06Model Year: 2006
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 111/16

HIC(d) = 416, HIC = 331, Delta T = 9.5 msec



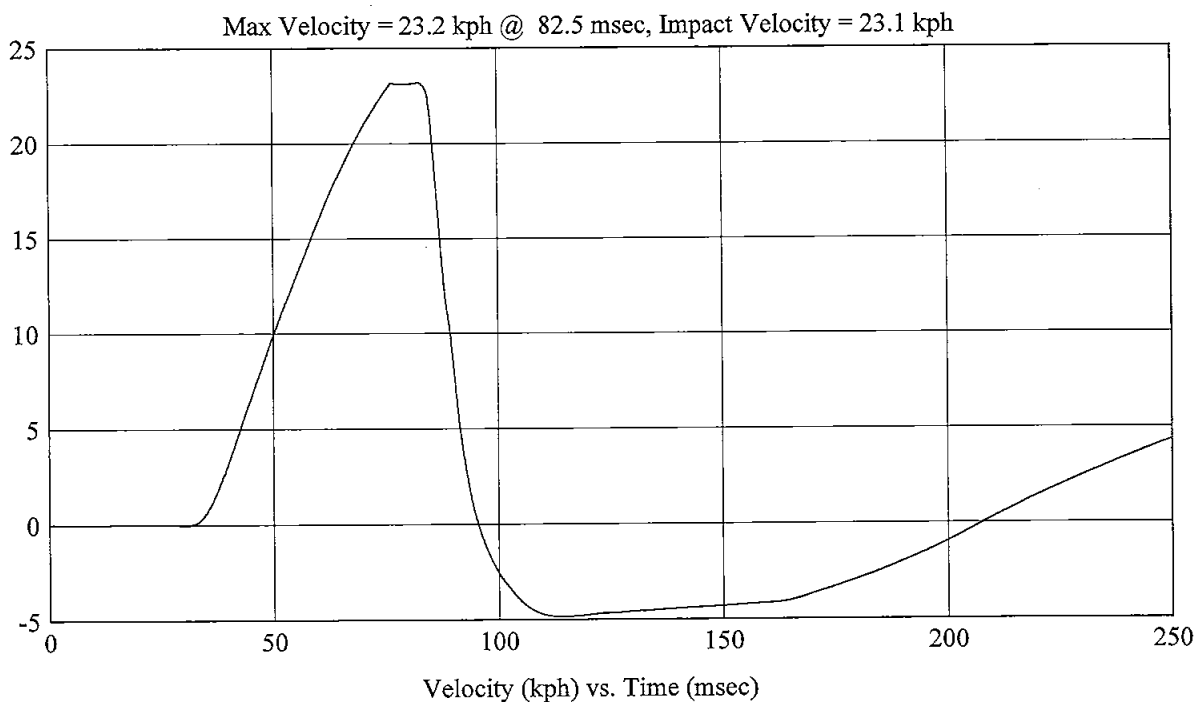
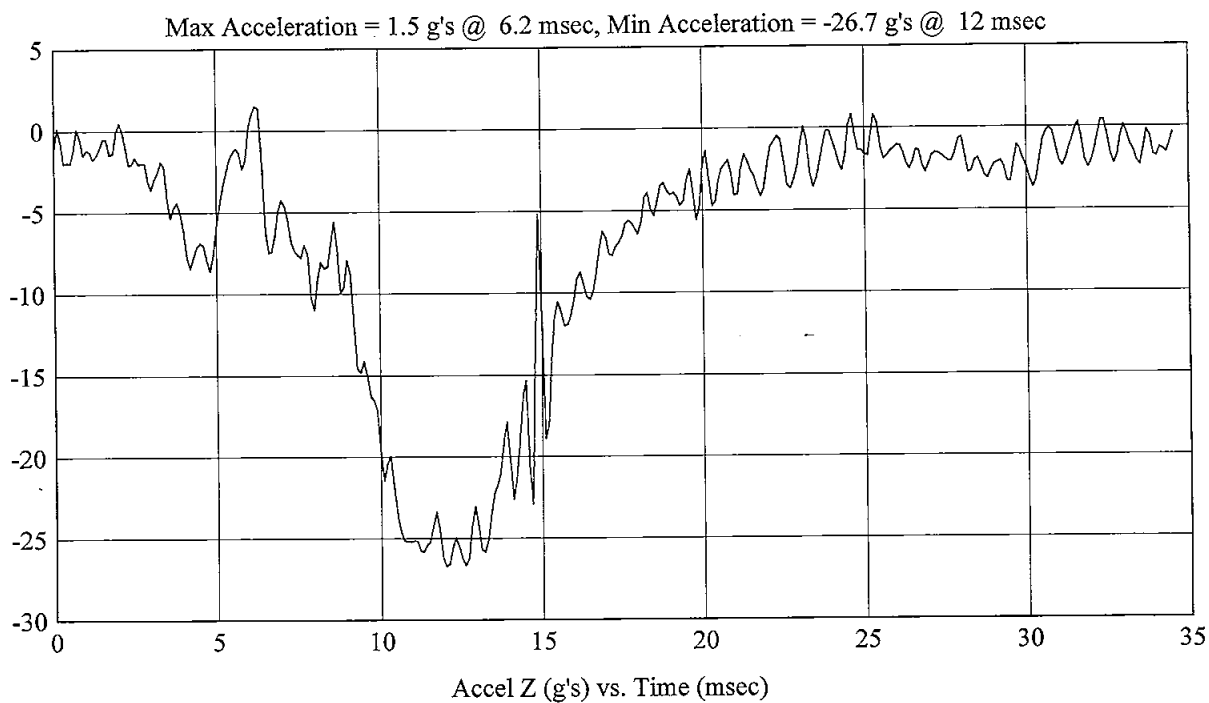
FMH
G06I7-001.4Customer: NHTSA
Test # 8
FM6172
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 111/16

HIC(d) = 416, HIC = 331, Delta T = 9.5 msec



FMH
G06I7-001.4

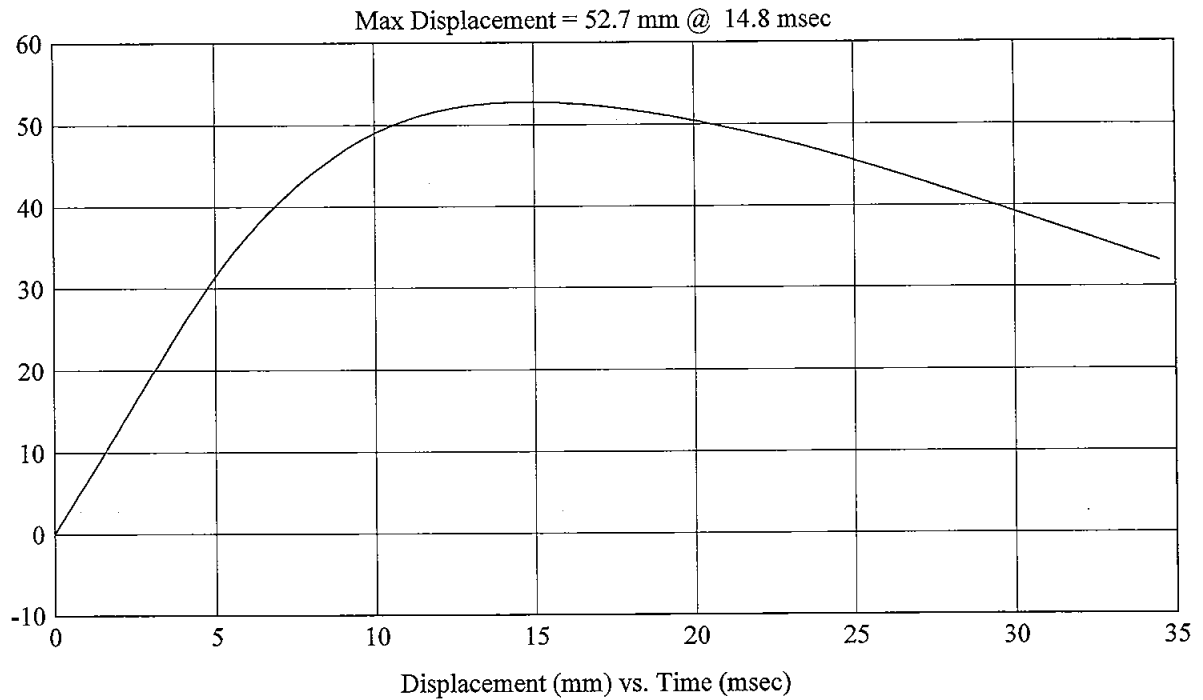
Customer: NHTSA
Test # 8
FM6172
Additional Desc: N/A

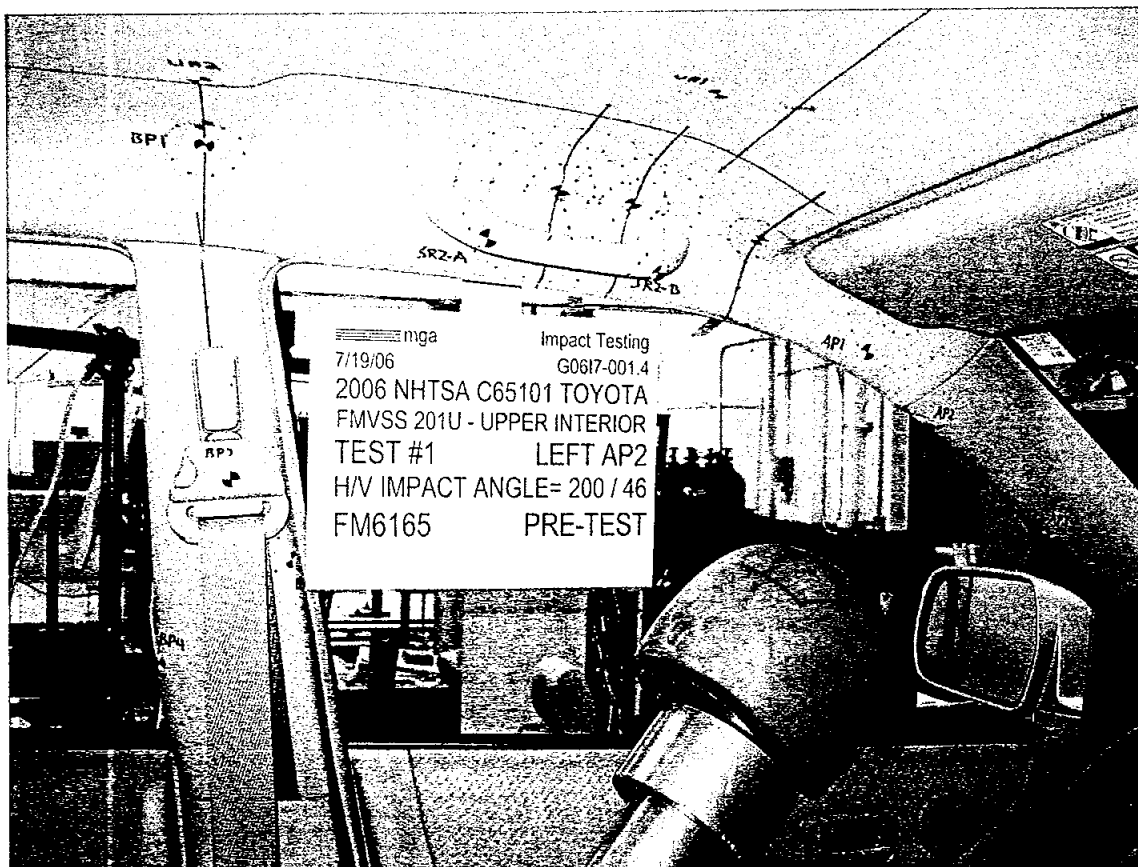
Vehicle Program : Toyota

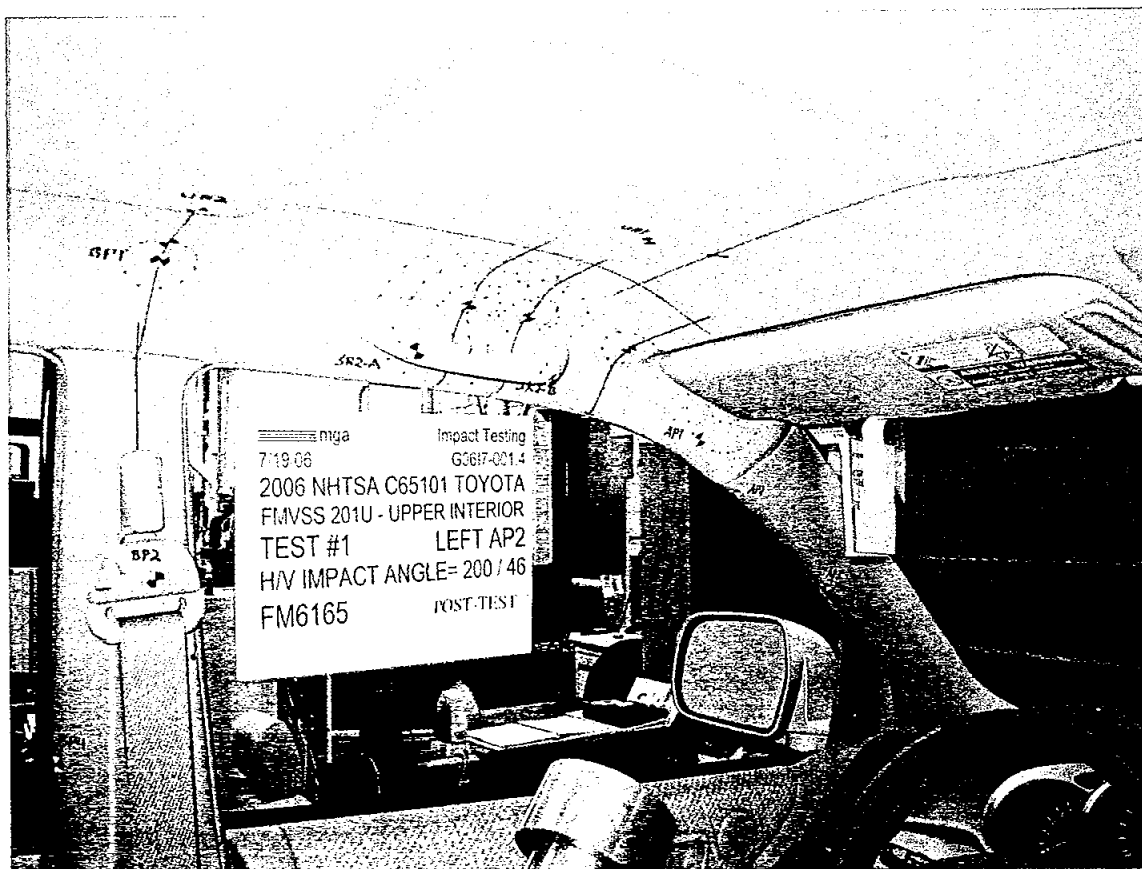
Test Date: 7/20/06

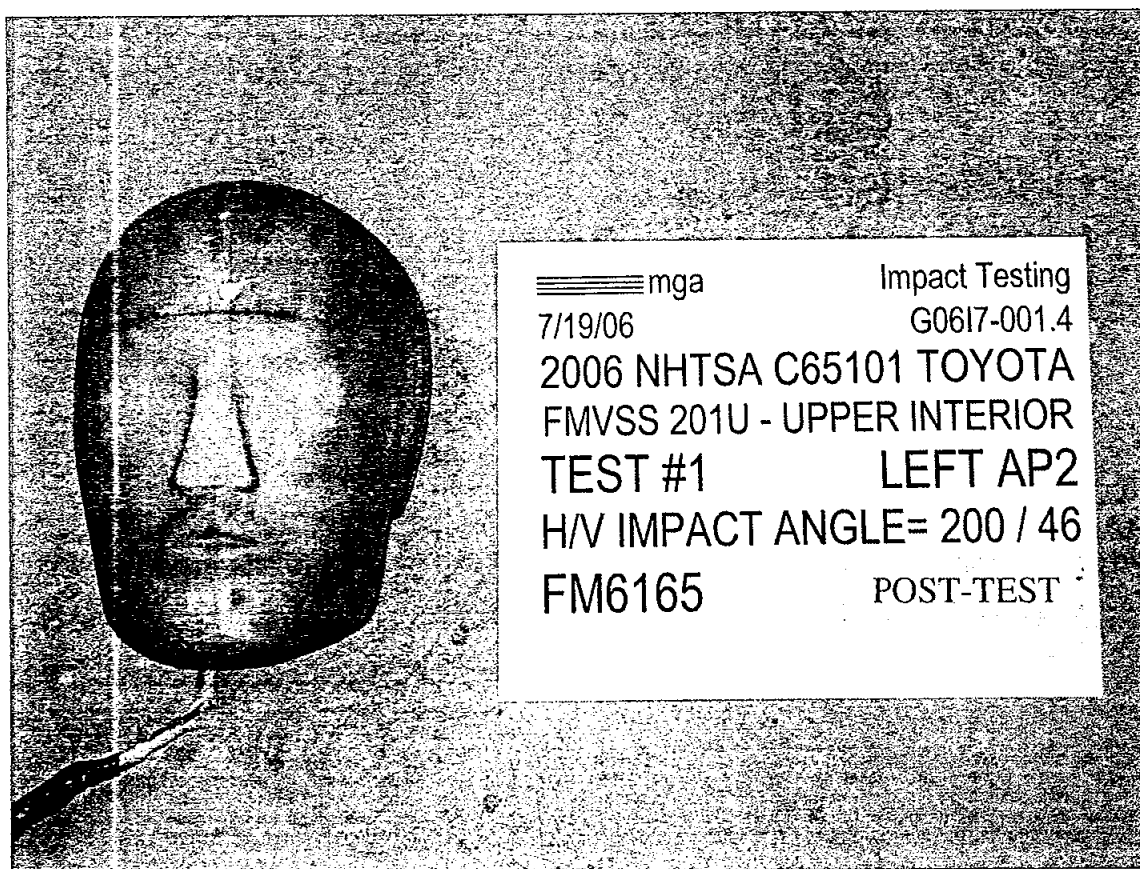
Model Year: 2006
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 111/16

HIC(d) = 416, HIC = 331, Delta T = 9.5 msec









SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.4 VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#1

Target (Vehicle Side): AP2Left

Temperature: 25C

MGA Test Reference No.:FM6165

Humidity: 40%

Approach Horizontal Angles:200°

Time of Test: 3:15 PM

Approach Vertical Angles:46°

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
762	789	7.5	24.0	10	5 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-91.4	1.54	1.54
Y	6	J35919	94.4	1.53	1.54
Z	7	J22664	94.3	1.45	1.45

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

A-pillar dislodged.

Recorded By: Matt Kerr Approved By: Heena A. Kalote Date: 7/19/06
 *Only necessary for NHTSA (Government) Compliance testing.

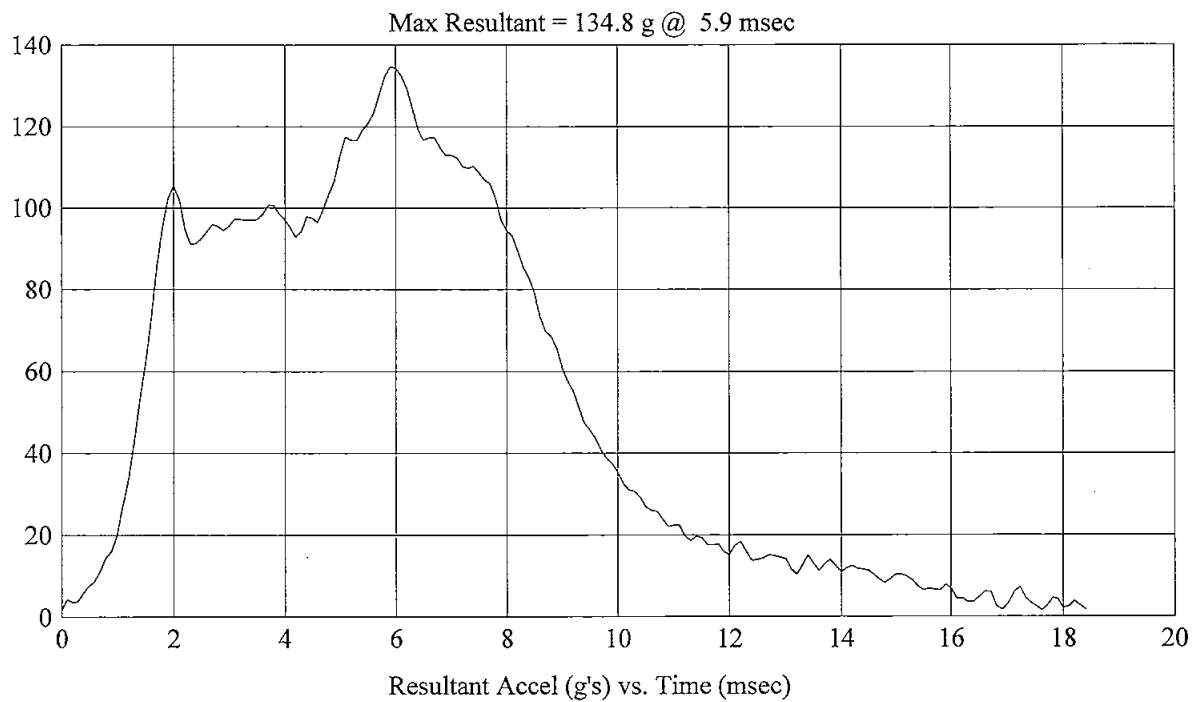
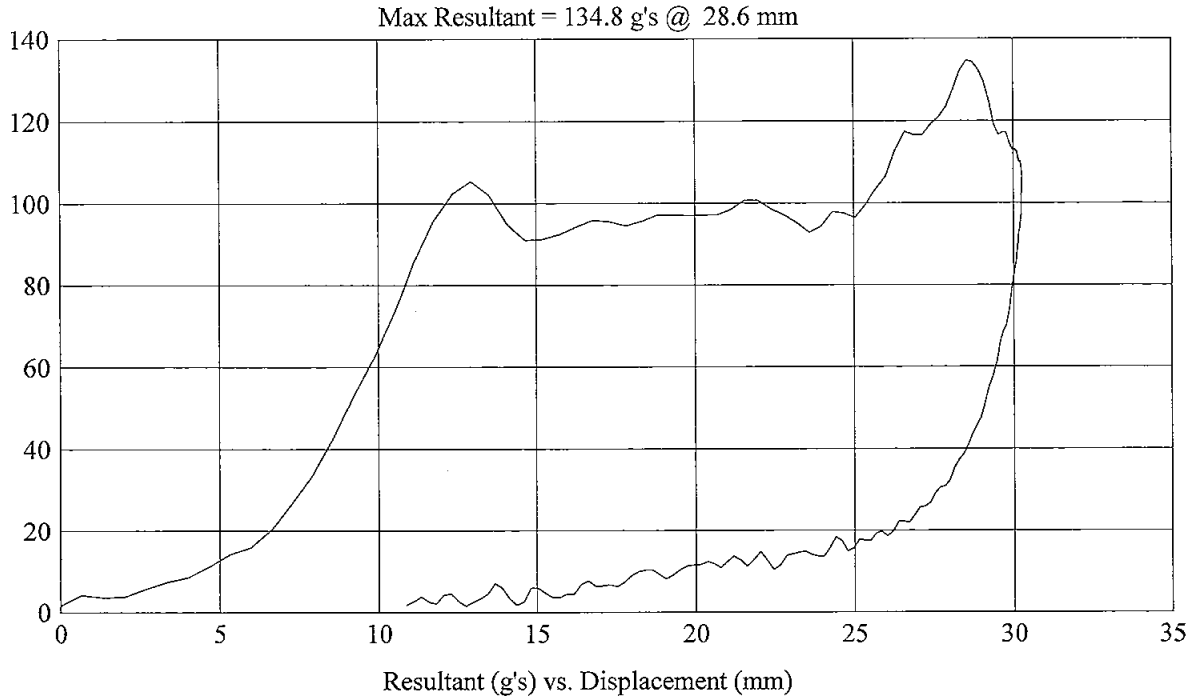
FMH
G06I7-001.4

Customer: NHTSA
Test # 1
FM6165
Additional Desc: N/A

Vehicle Program : Toyota
Test Date: 7/19/06

Model Year: 2006
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 200/46

HIC(d) = 762, HIC = 789, Delta T = 7.5 msec



FMH
G06I7-001.4

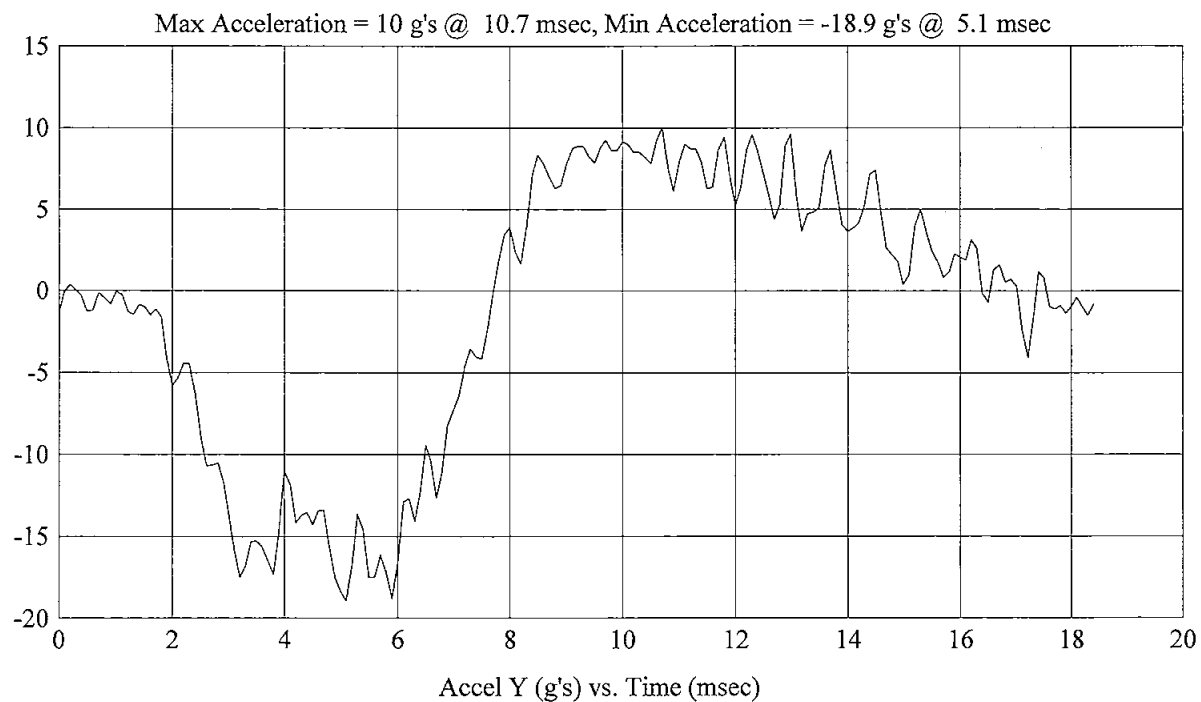
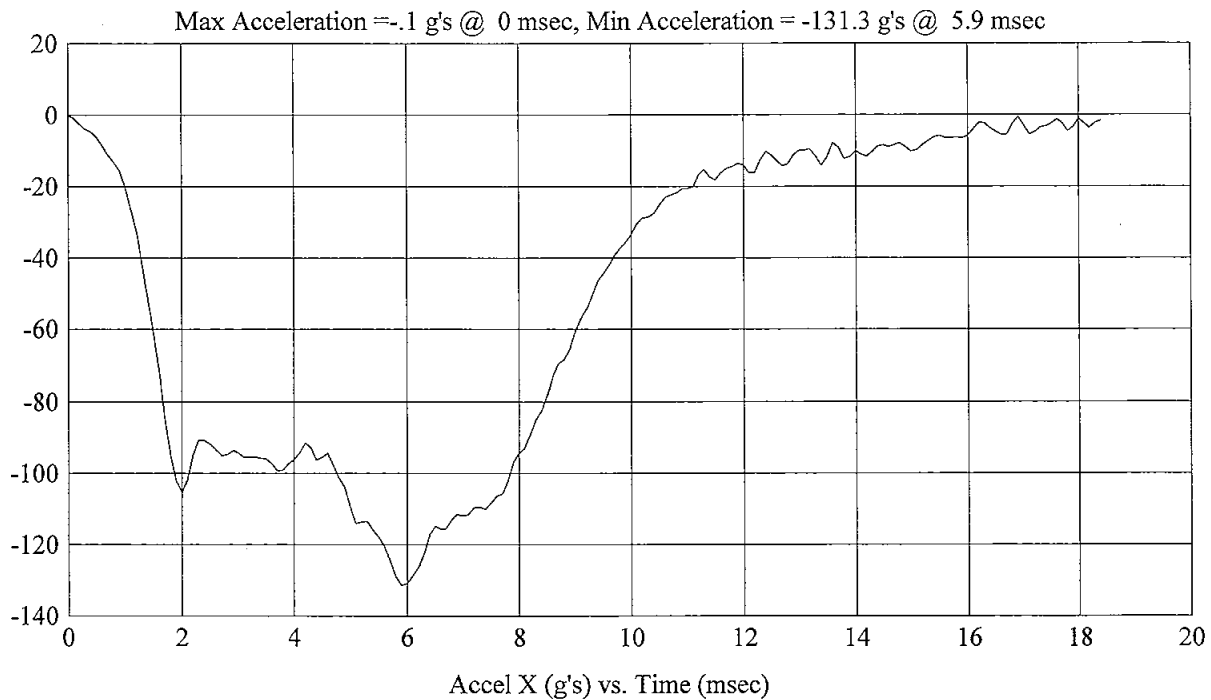
Customer: NHTSA
Test # 1
FM6165
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/19/06

Model Year: 2006
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 200/46

HIC(d) = 762, HIC = 789, Delta T = 7.5 msec



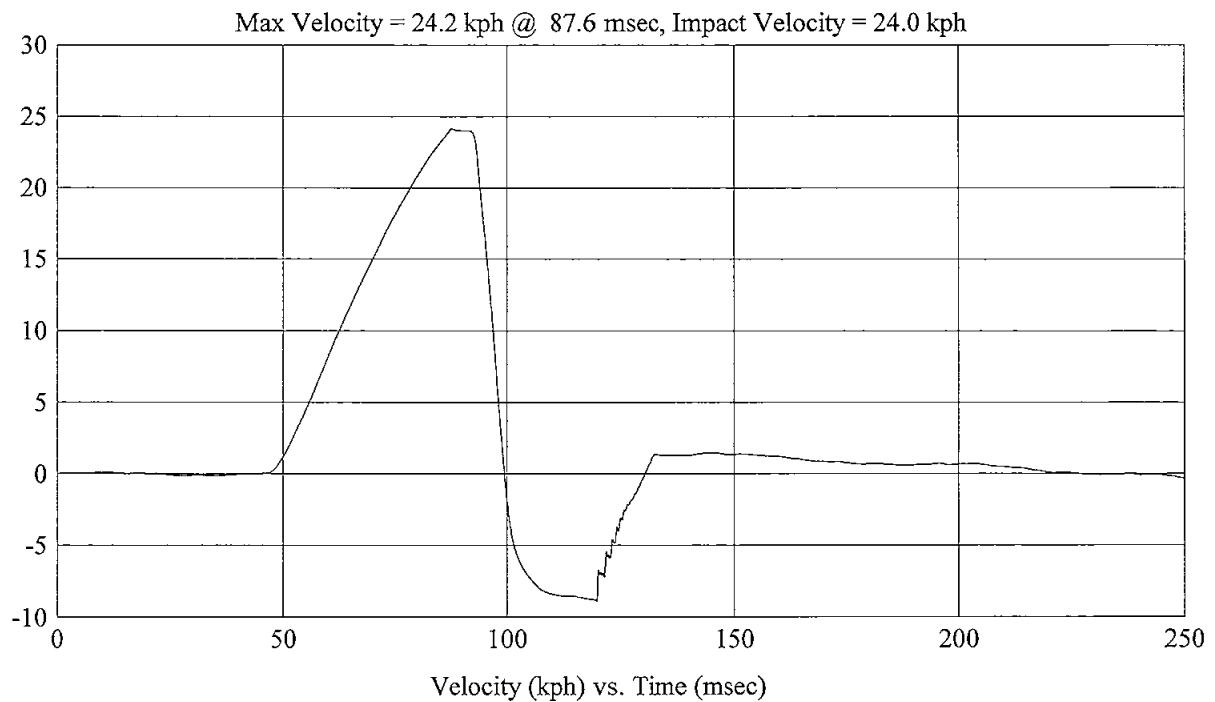
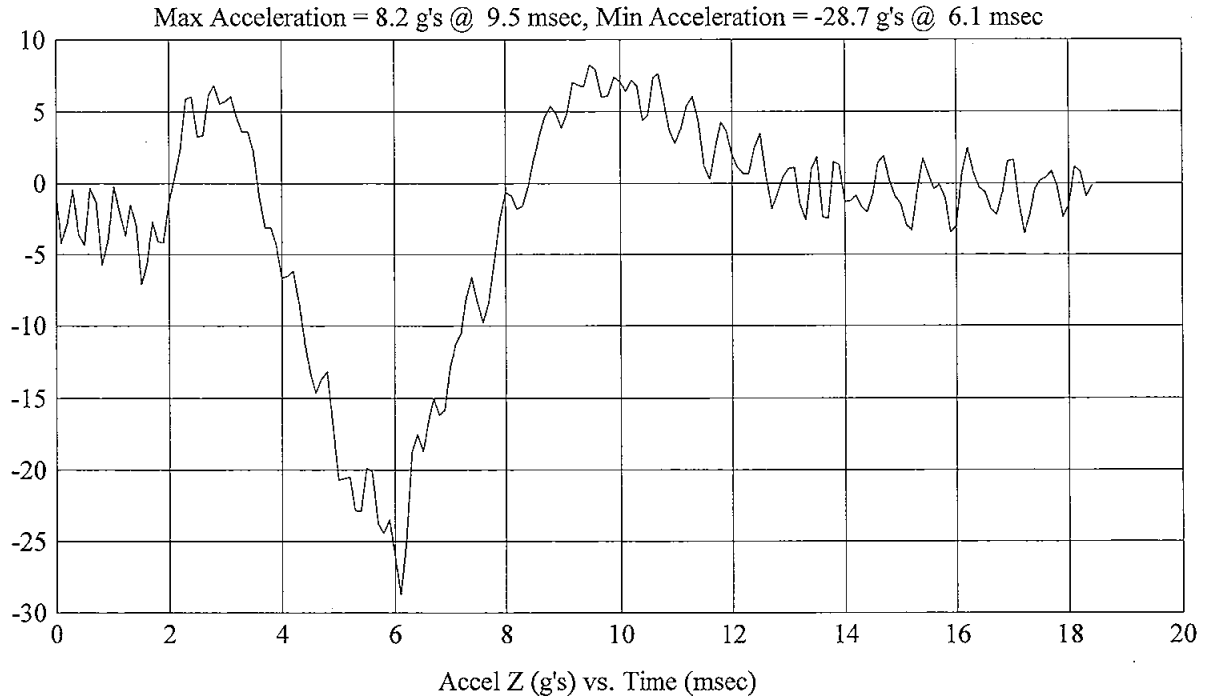
FMH
G06I7-001.4

Customer: NHTSA
Test # 1
FM6165
Additional Desc: N/A

Vehicle Program : Toyota
Test Date: 7/19/06

Model Year: 2006
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 200/46

HIC(d) = 762, HIC = 789, Delta T = 7.5 msec



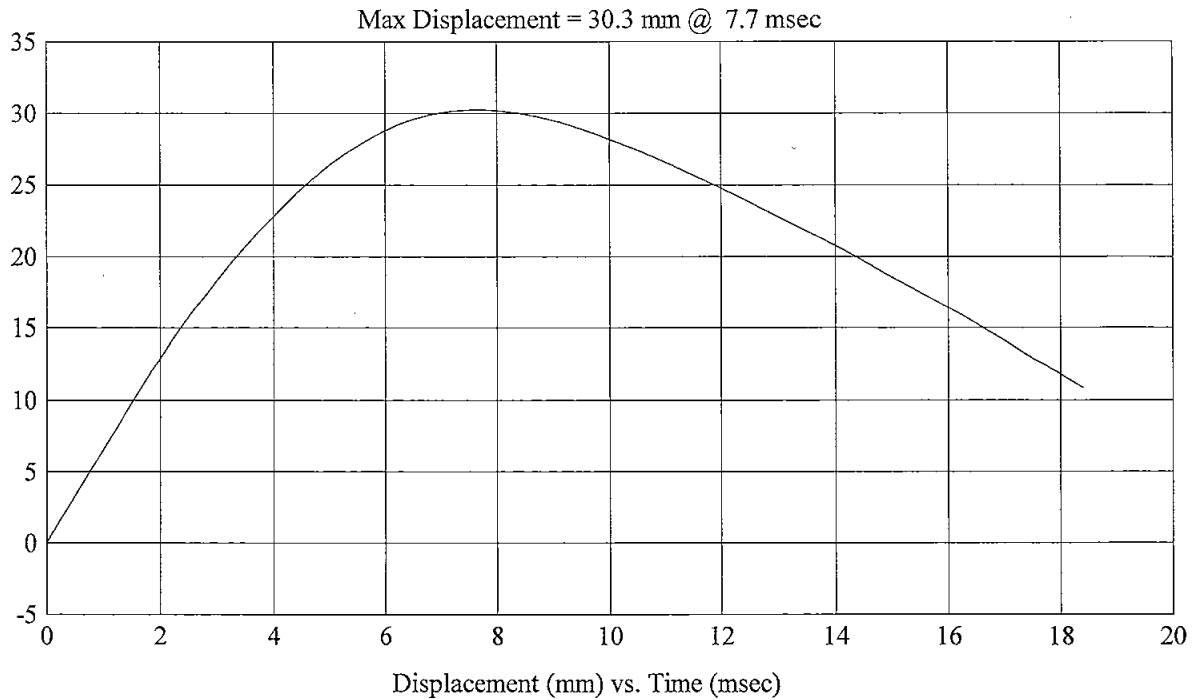
FMH
G06I7-001.4

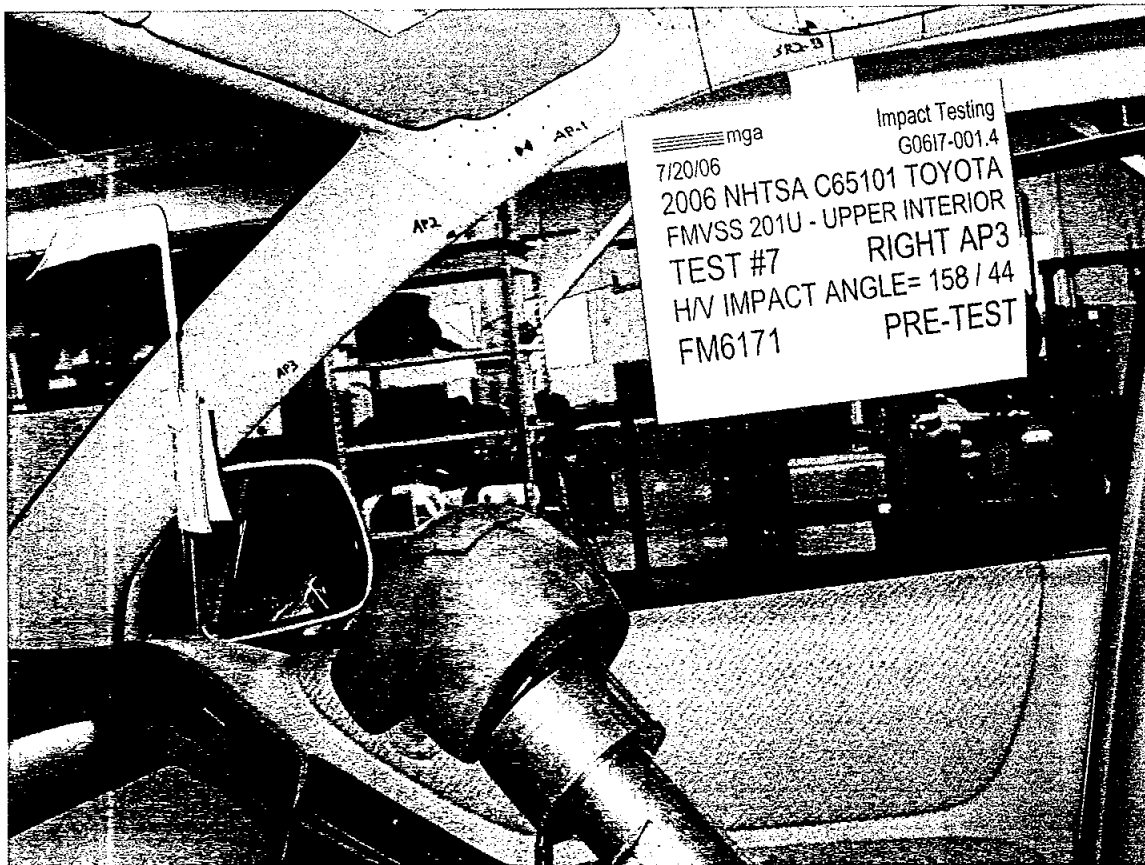
Customer: NHTSA
Test # 1
FM6165
Additional Desc: N/A

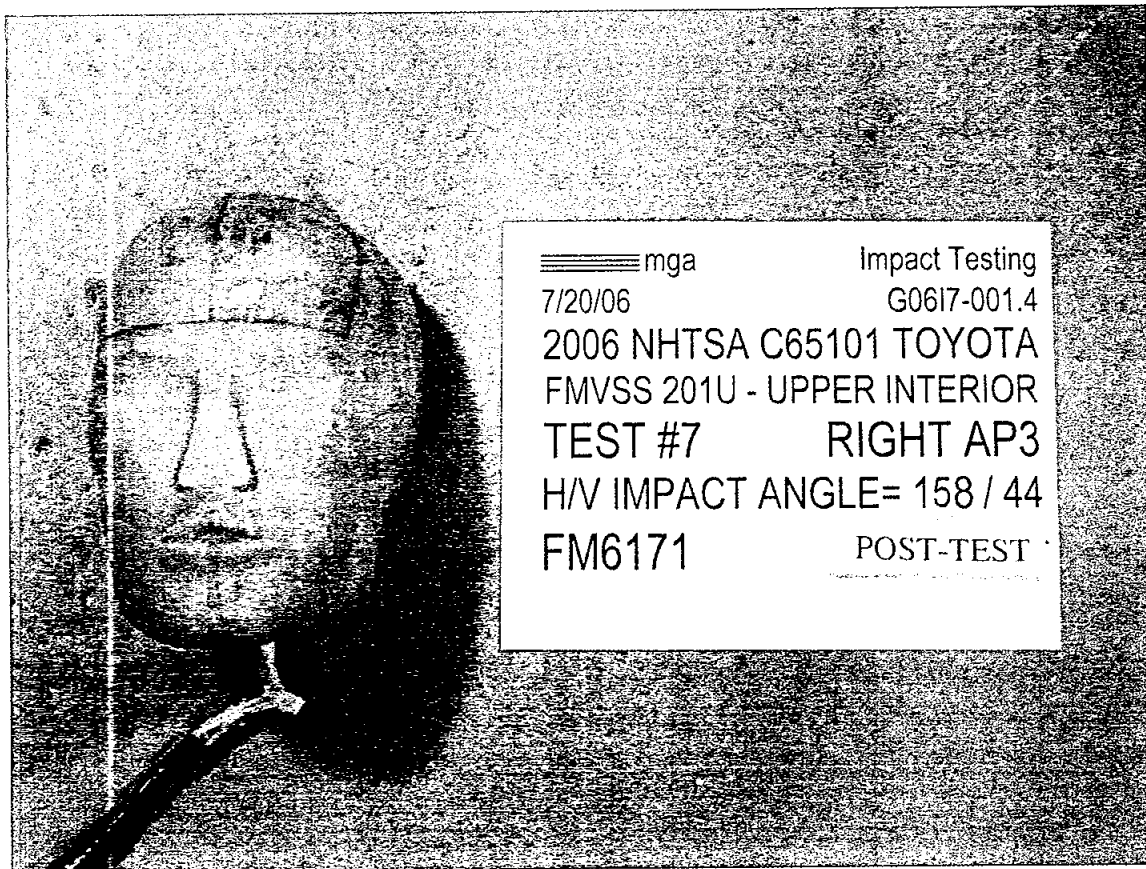
Vehicle Program : Toyota
Test Date: 7/19/06

Model Year: 2006
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 200/46

HIC(d) = 762, HIC = 789, Delta T = 7.5 msec







SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.4

VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#7

Target (Vehicle Side): AP3Right

Temperature:25C

MGA Test Reference No.:FM6171

Humidity:44%

Approach Horizontal Angles:158°

Time of Test:2:30 PM

Approach Vertical Angles:44°

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
790	826	5.9	24.2	12	12 Left

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-91.4	1.54	1.54
Y	6	J35919	94.4	1.53	1.54
Z	7	J22664	94.3	1.45	1.45

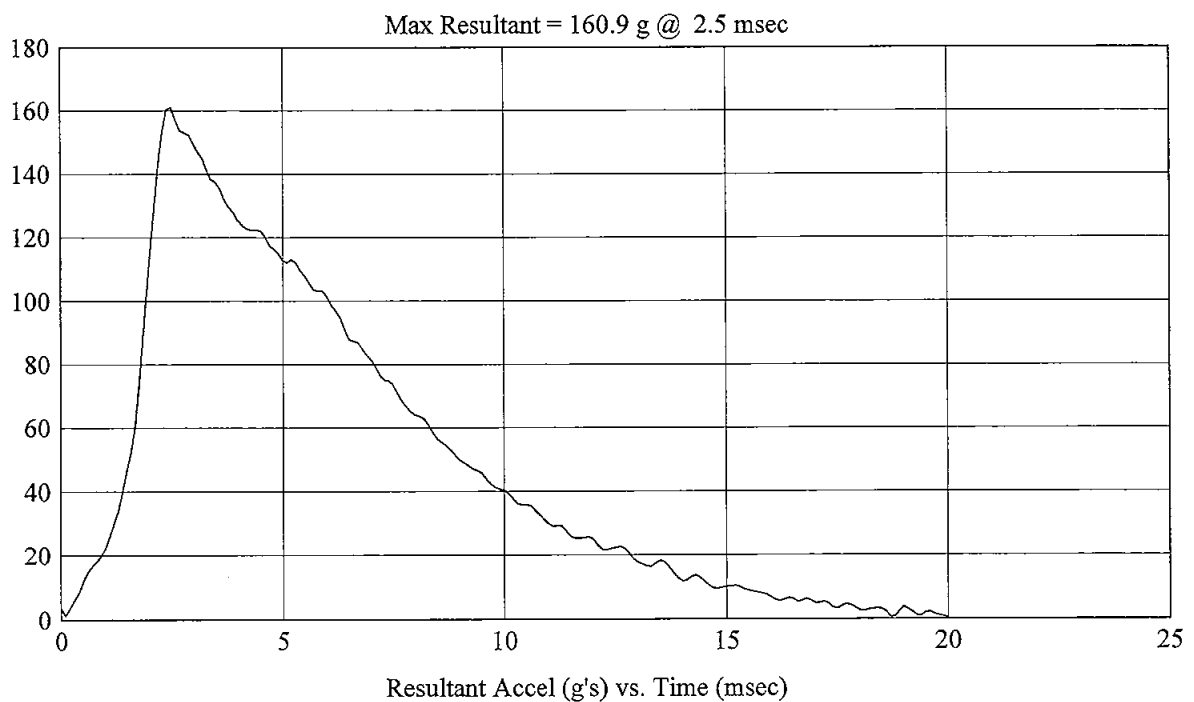
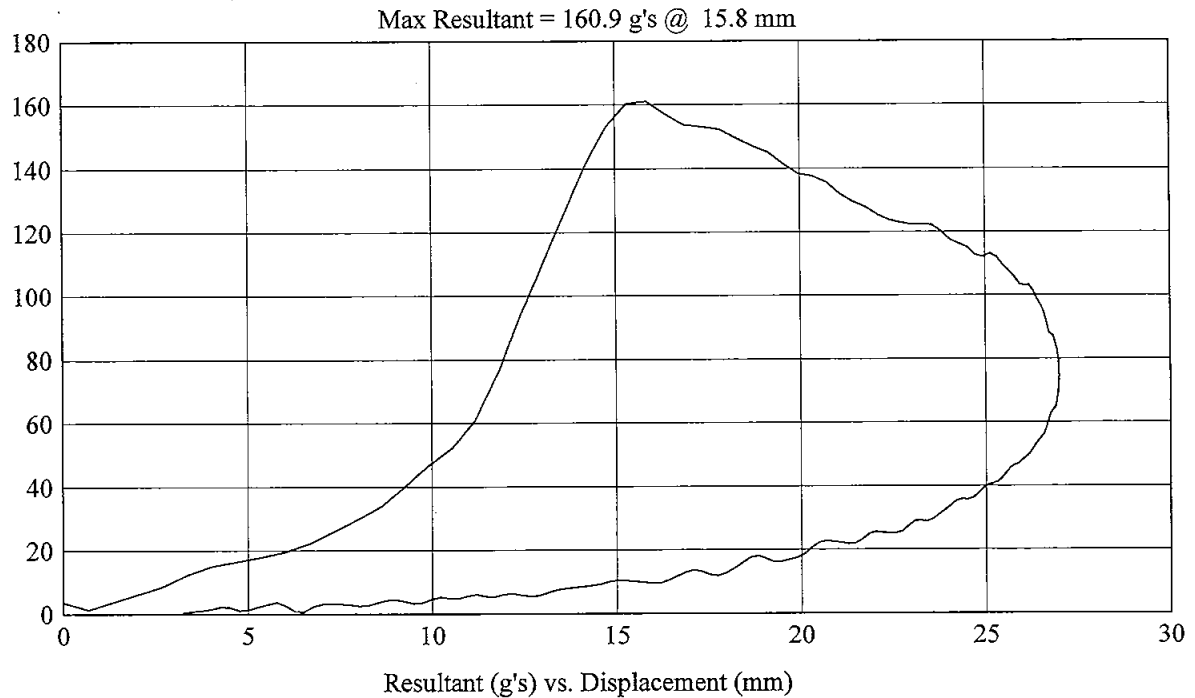
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage.

Recorded By: Matt Kerr Approved By: Aileen A. Kalato Date: 7/20/06
 *Only necessary for NHTSA (Government) Compliance testing.

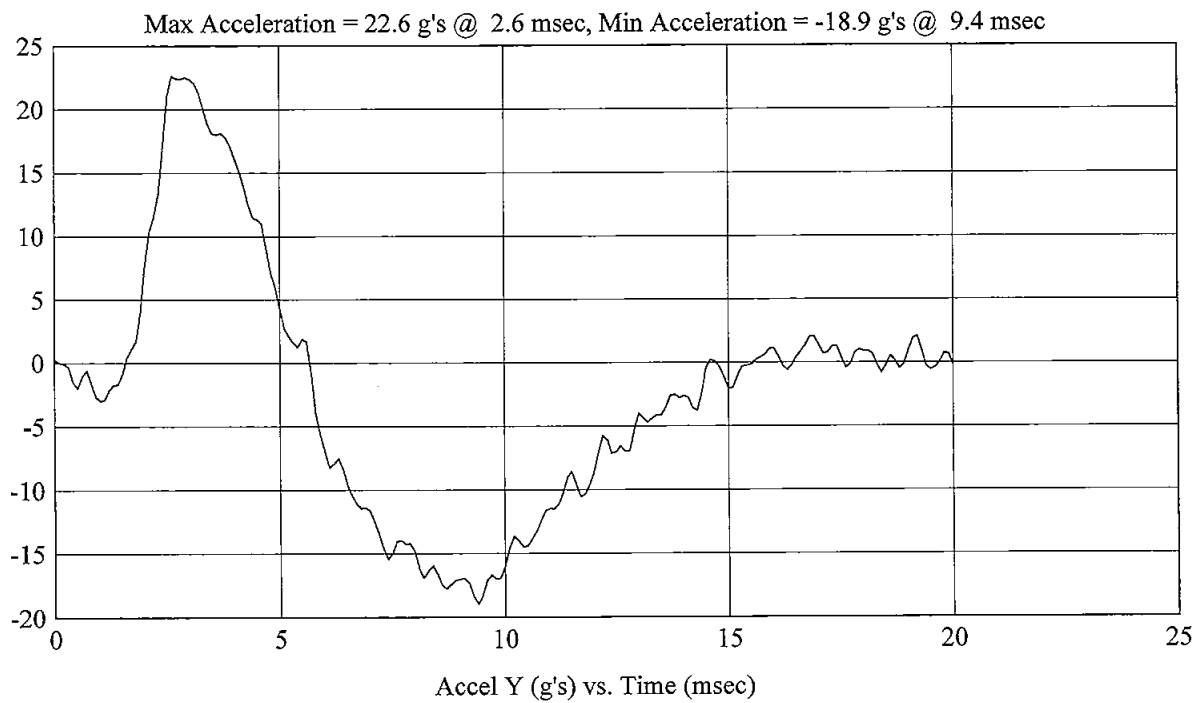
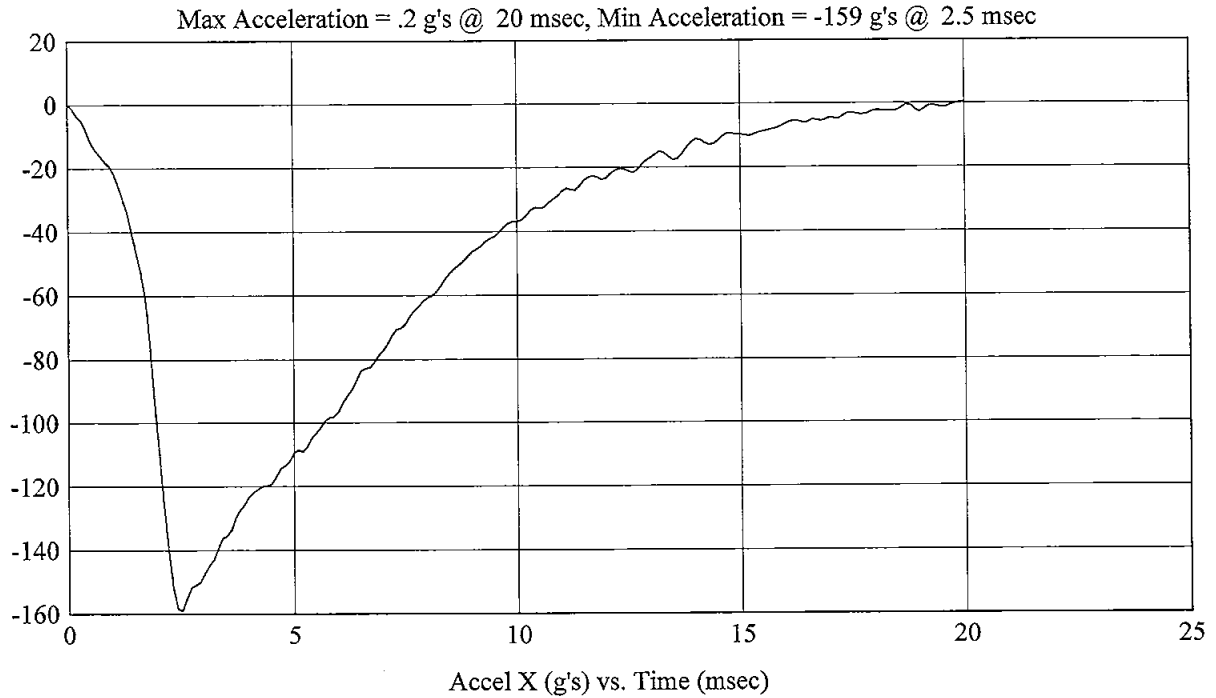
FMH
G06I7-001.4Customer: NHTSA
Test # 7
FM6171
Additional Desc: N/AVehicle Program : Toyota
Test Date: 7/20/06Model Year: 2006
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 158/44

HIC(d) = 790, HIC = 826, Delta T = 5.9 msec



FMH
G06I7-001.4Customer: NHTSA
Test # 7
FM6171
Additional Desc: N/AVehicle Program : Toyota
Test Date: 7/20/06Model Year: 2006
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 158/44

HIC(d) = 790, HIC = 826, Delta T = 5.9 msec



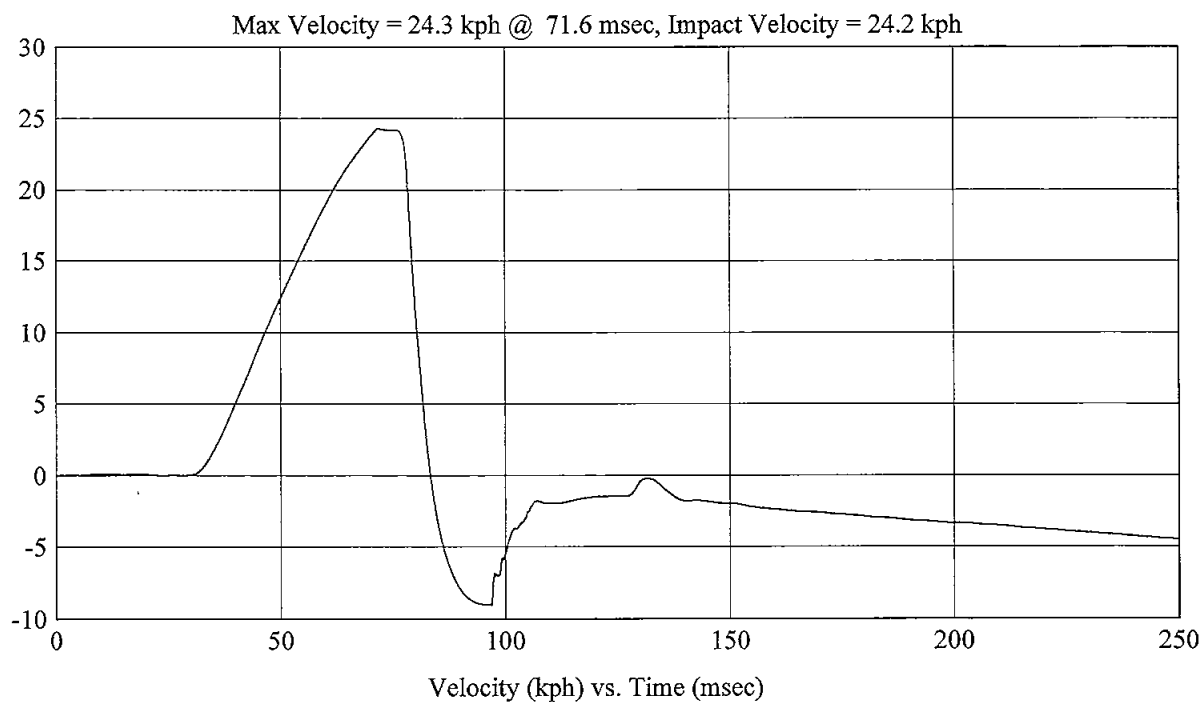
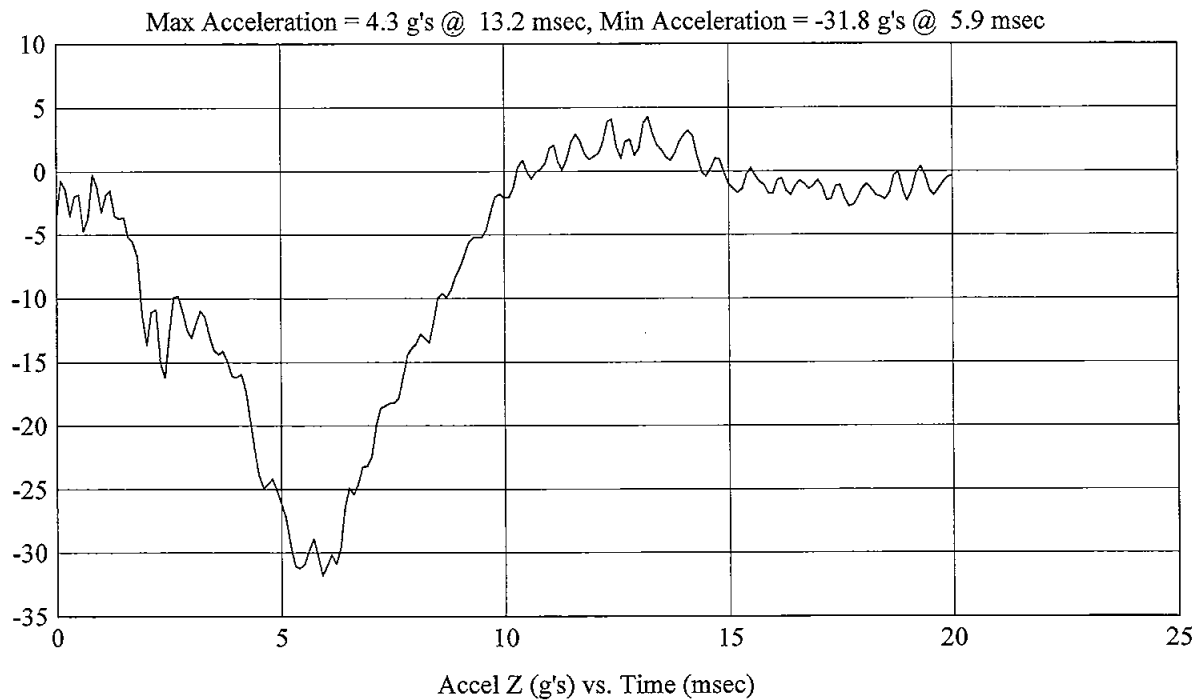
FMH
G06I7-001.4Customer: NHTSA
Test # 7
FM6171
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 158/44

HIC(d) = 790, HIC = 826, Delta T = 5.9 msec



FMH
G06I7-001.4

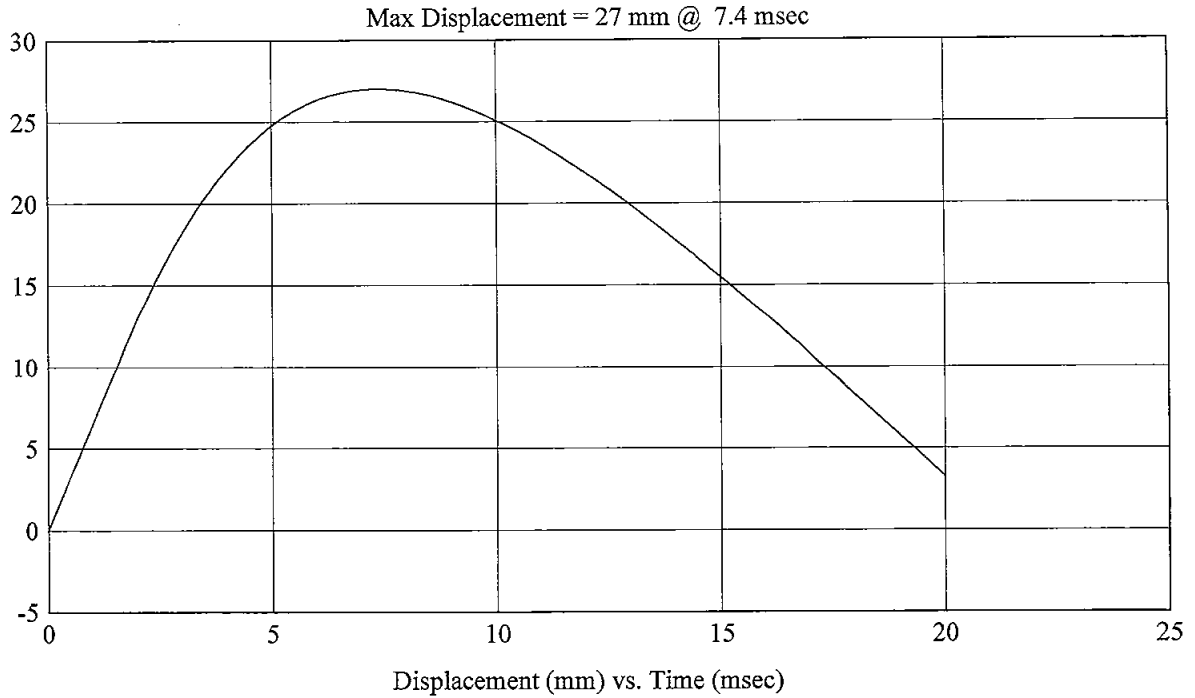
Customer: NHTSA
Test # 7
FM6171
Additional Desc: N/A

Vehicle Program : Toyota

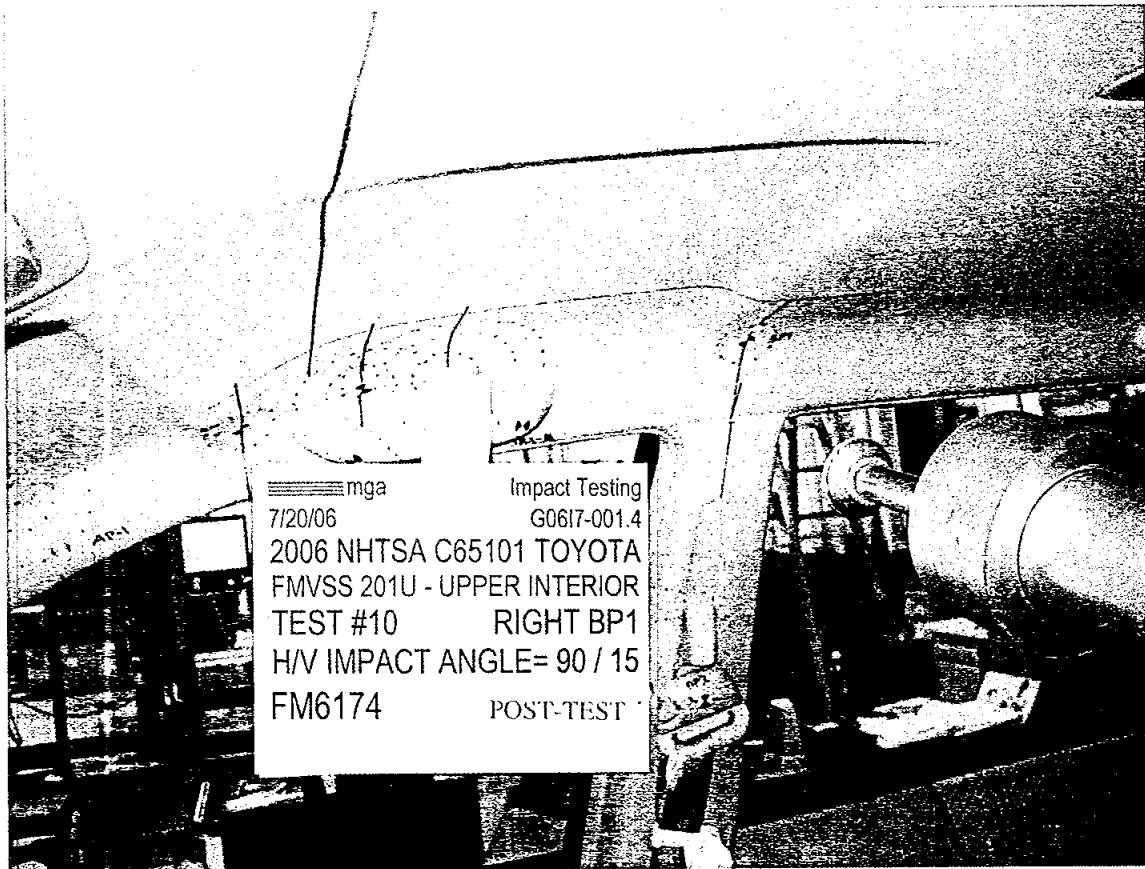
Test Date: 7/20/06

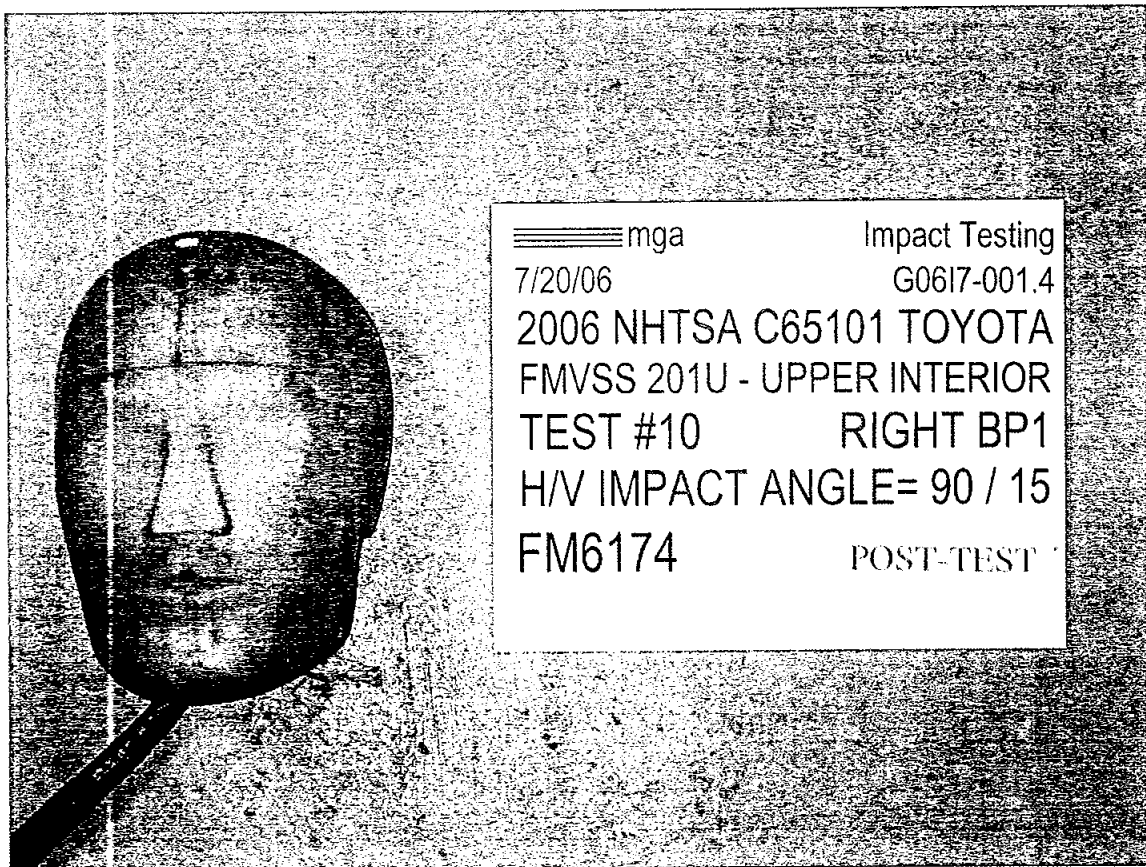
Model Year: 2006
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 158/44

HIC(d) = 790, HIC = 826, Delta T = 5.9 msec









SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.4 VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#10

Target (Vehicle Side): BP1 Right

Temperature:25C

MGA Test Reference No.:FM6174

Humidity:44%

Approach Horizontal Angles:90°

Time of Test:4:30 PM

Approach Vertical Angles:15°

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
678	679	7.2	23.8	74	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-91.4	1.55	1.54
Y	6	J35919	94.4	1.53	1.53
Z	7	J22664	94.3	1.45	1.45

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

No visible damage.

Recorded By: Matt Kerr Approved By*: Heena A. Kalote Date: 7/20/06
 *Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.4

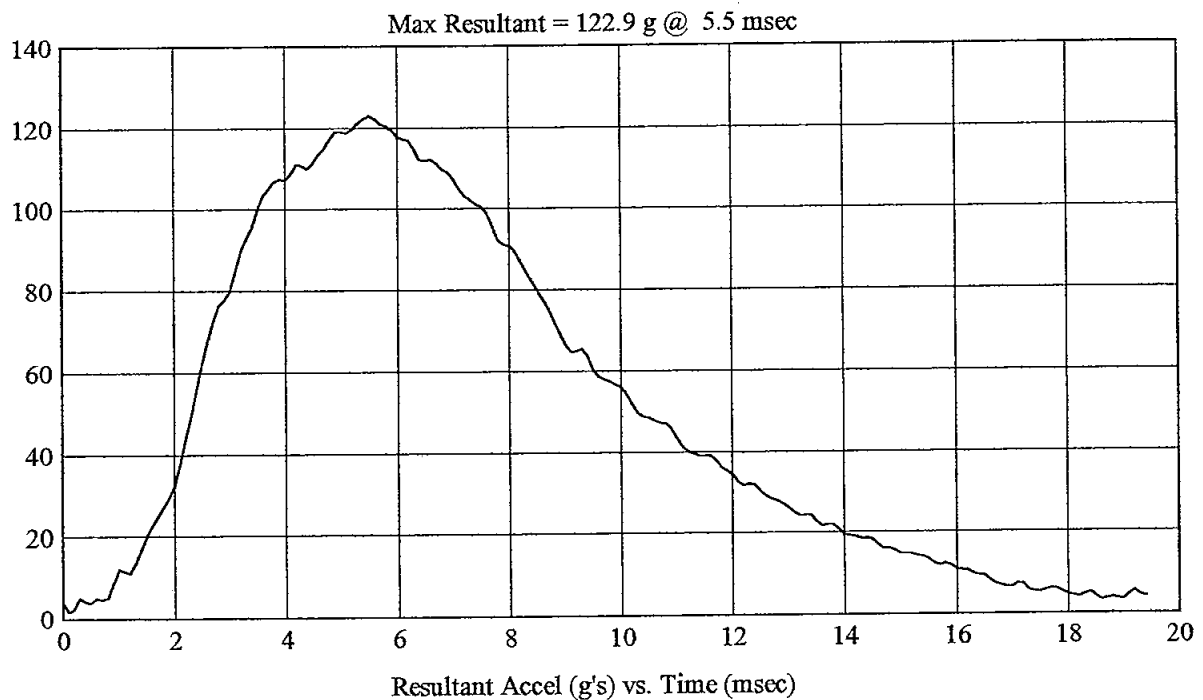
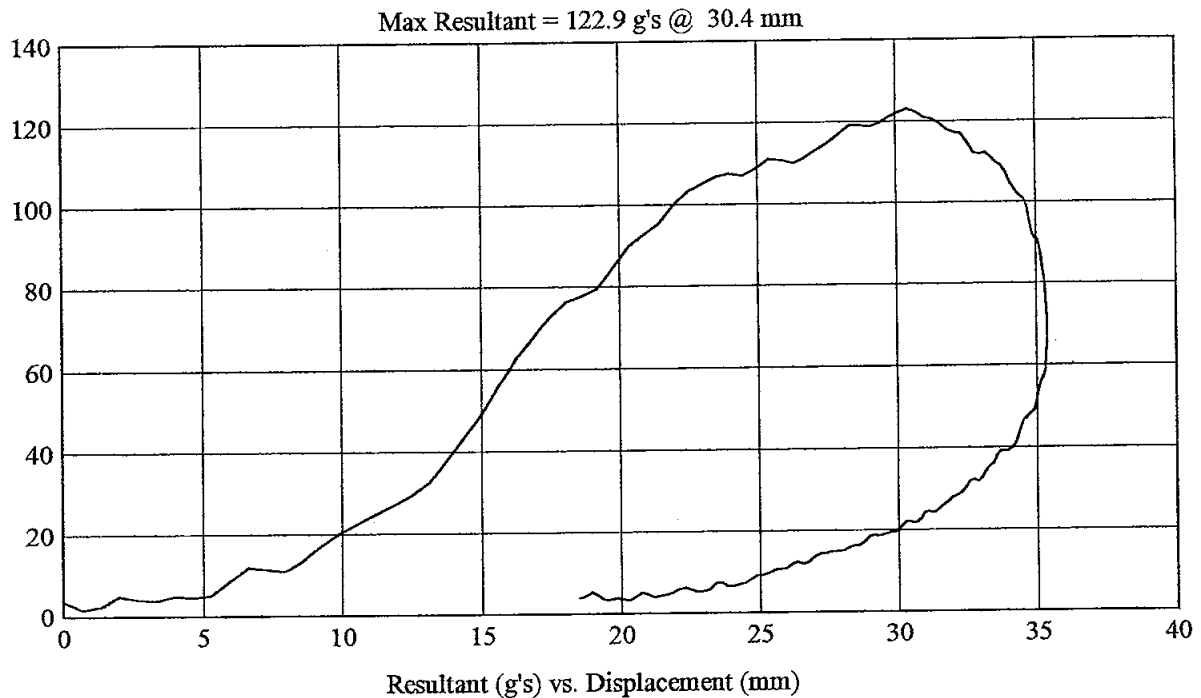
Customer: NHTSA
Test # 10
FM6174
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/15

HIC(d) = 678, HIC = 679, Delta T = 7.2 msec



FMH
G06I7-001.4

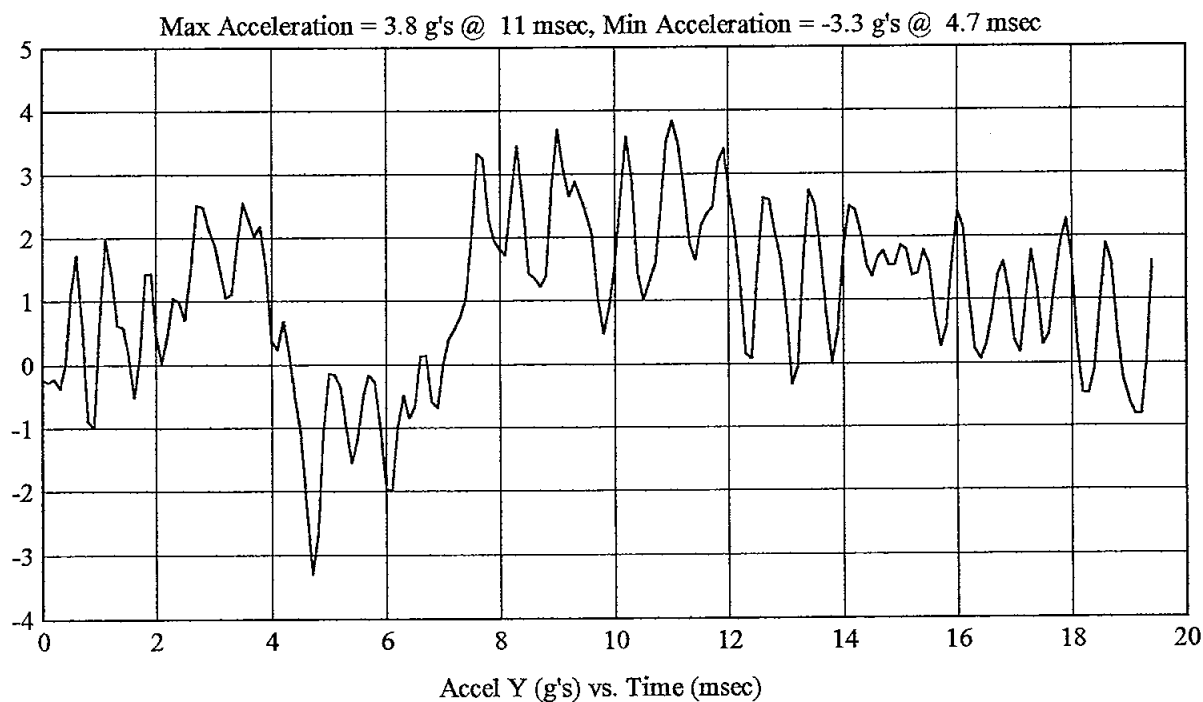
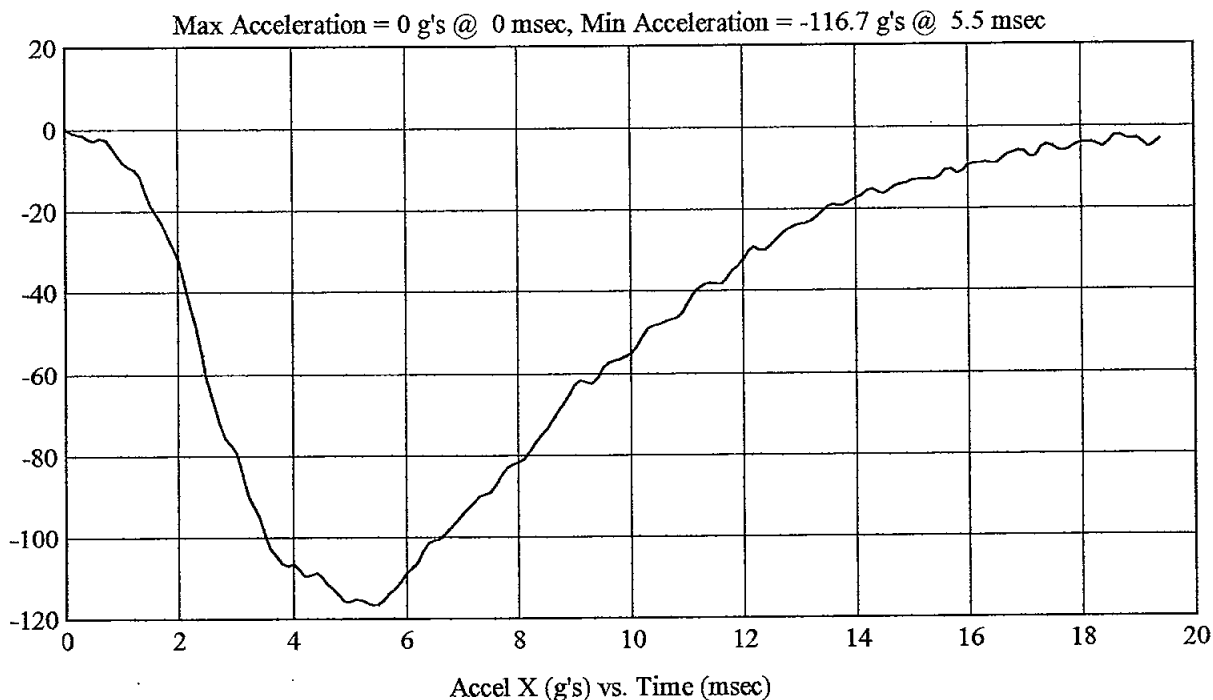
Customer: NHTSA
Test # 10
FM6174
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/15

HIC(d) = 678, HIC = 679, Delta T = 7.2 msec



FMH
G06I7-001.4

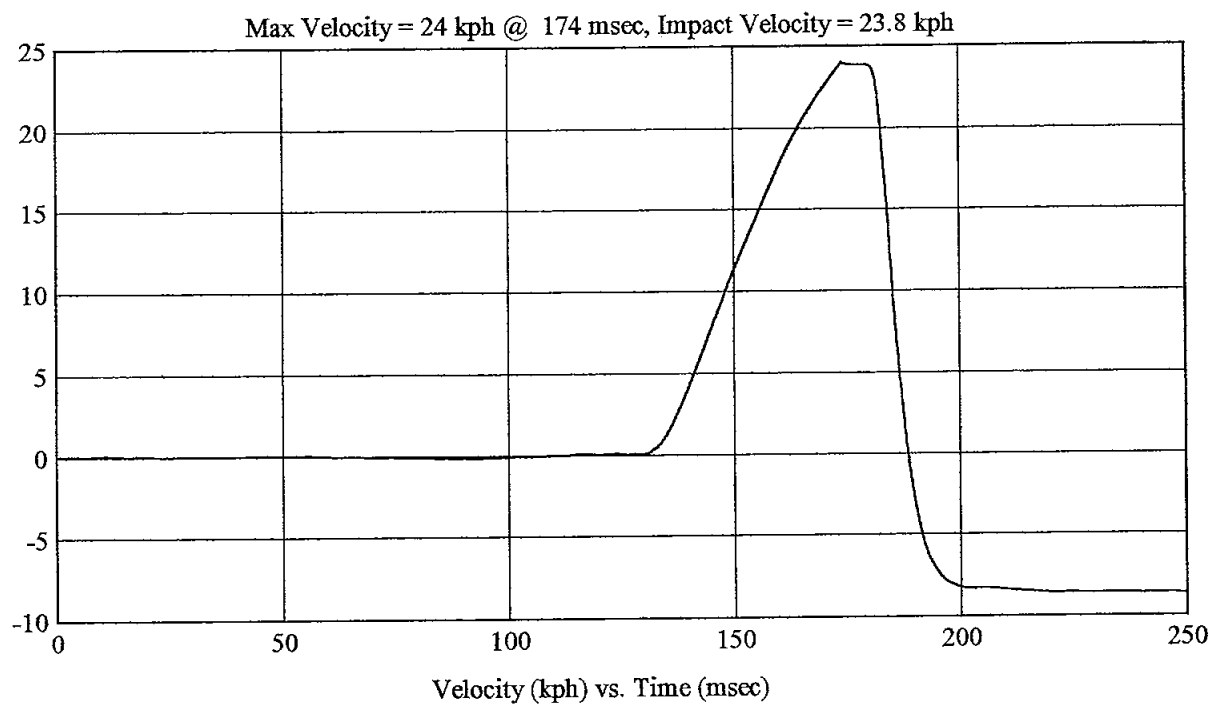
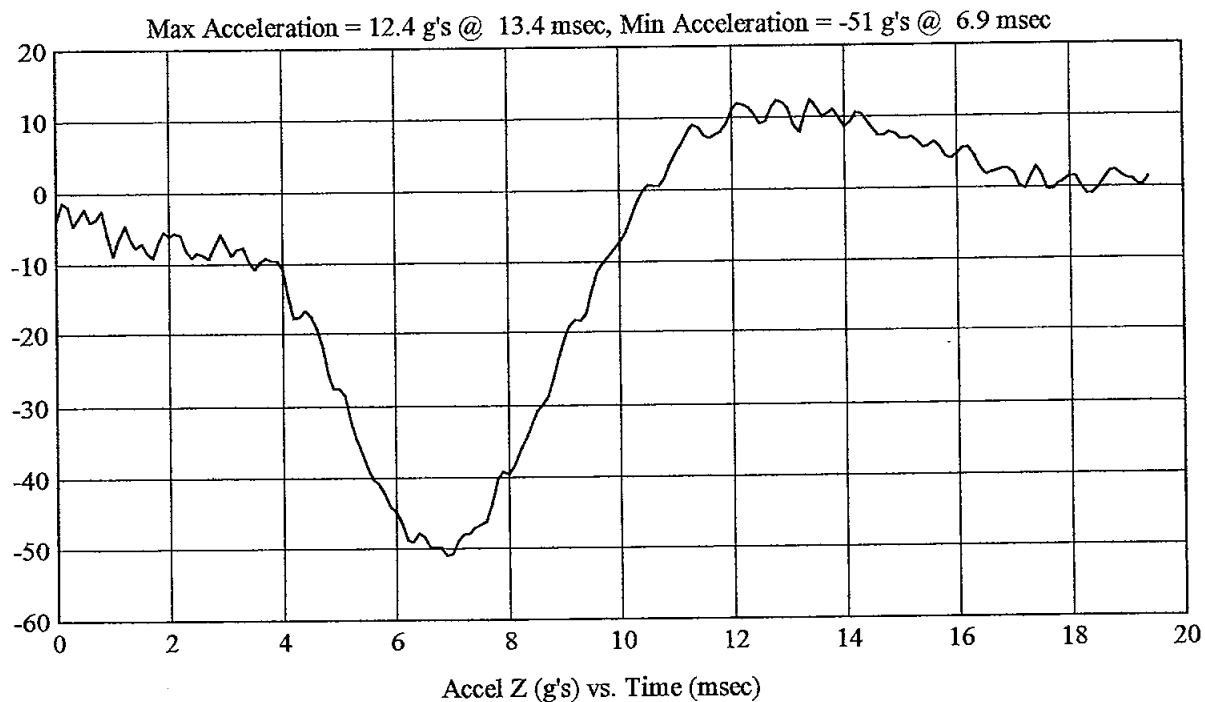
Customer: NHTSA
Test # 10
FM6174
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/15

HIC(d) = 678, HIC = 679, Delta T = 7.2 msec



FMH
G0617-001.4

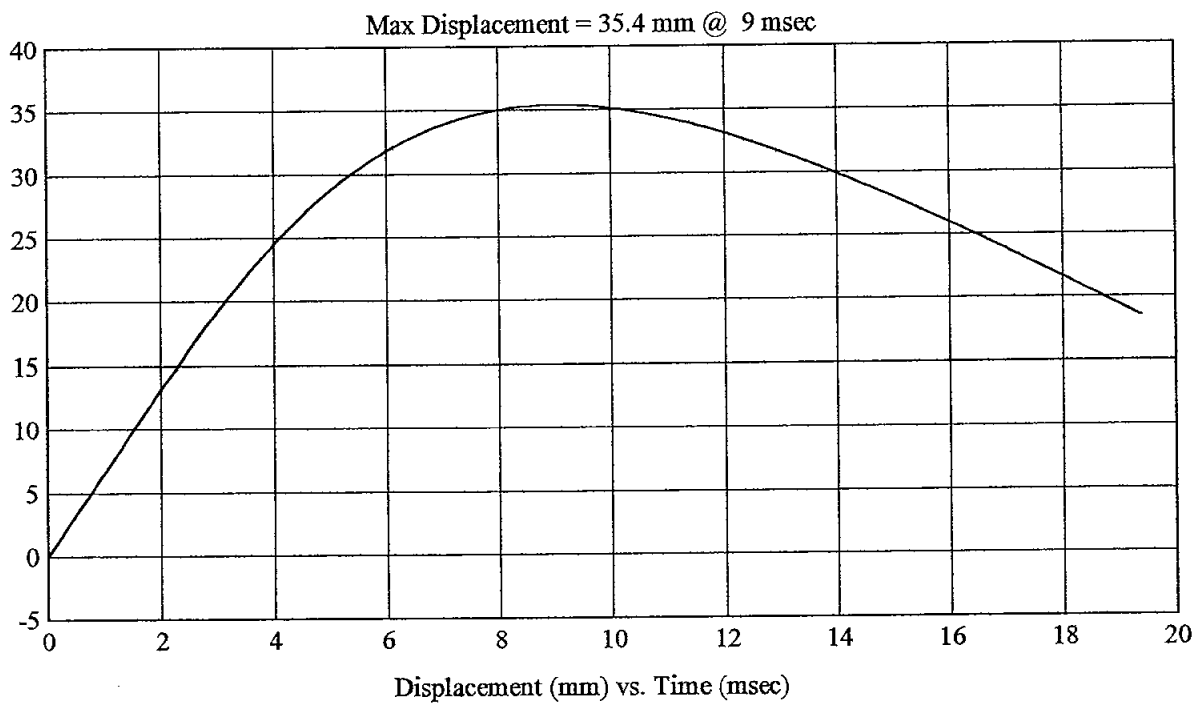
Customer: NHTSA
Test # 10
FM6174
Additional Desc: N/A

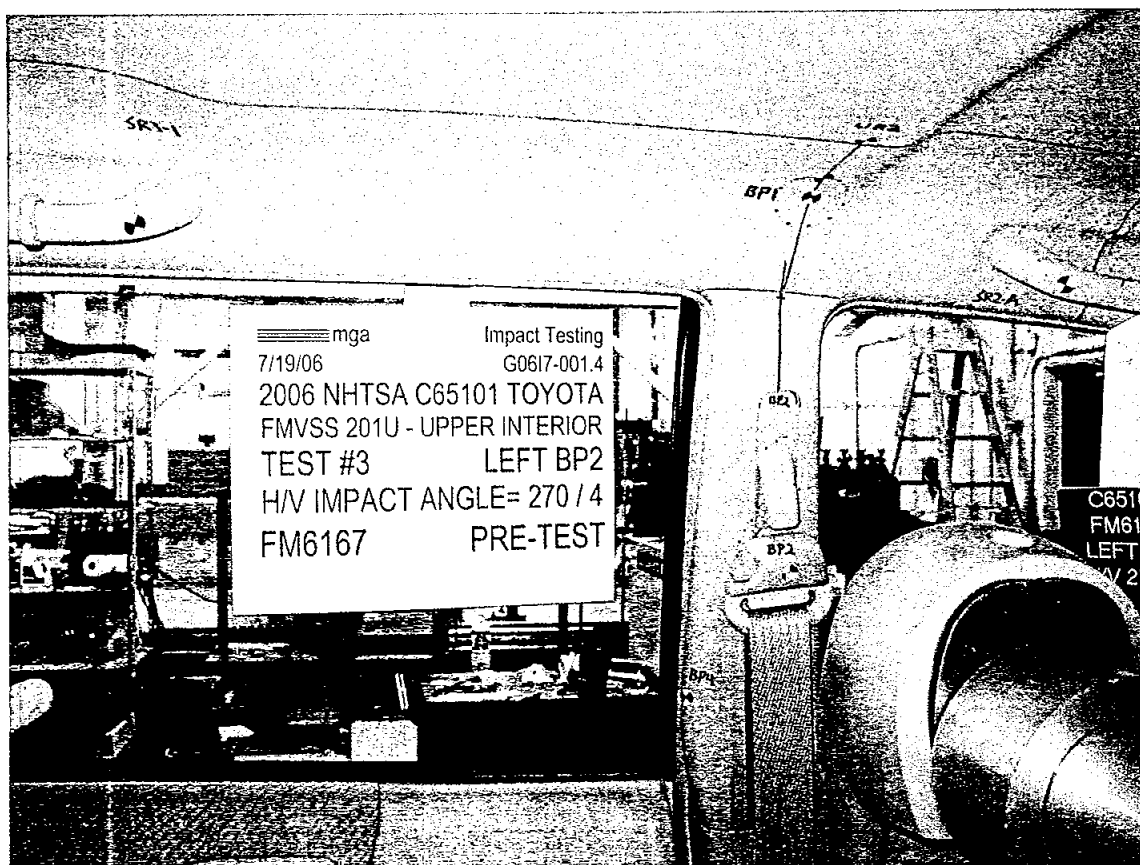
Vehicle Program : Toyota

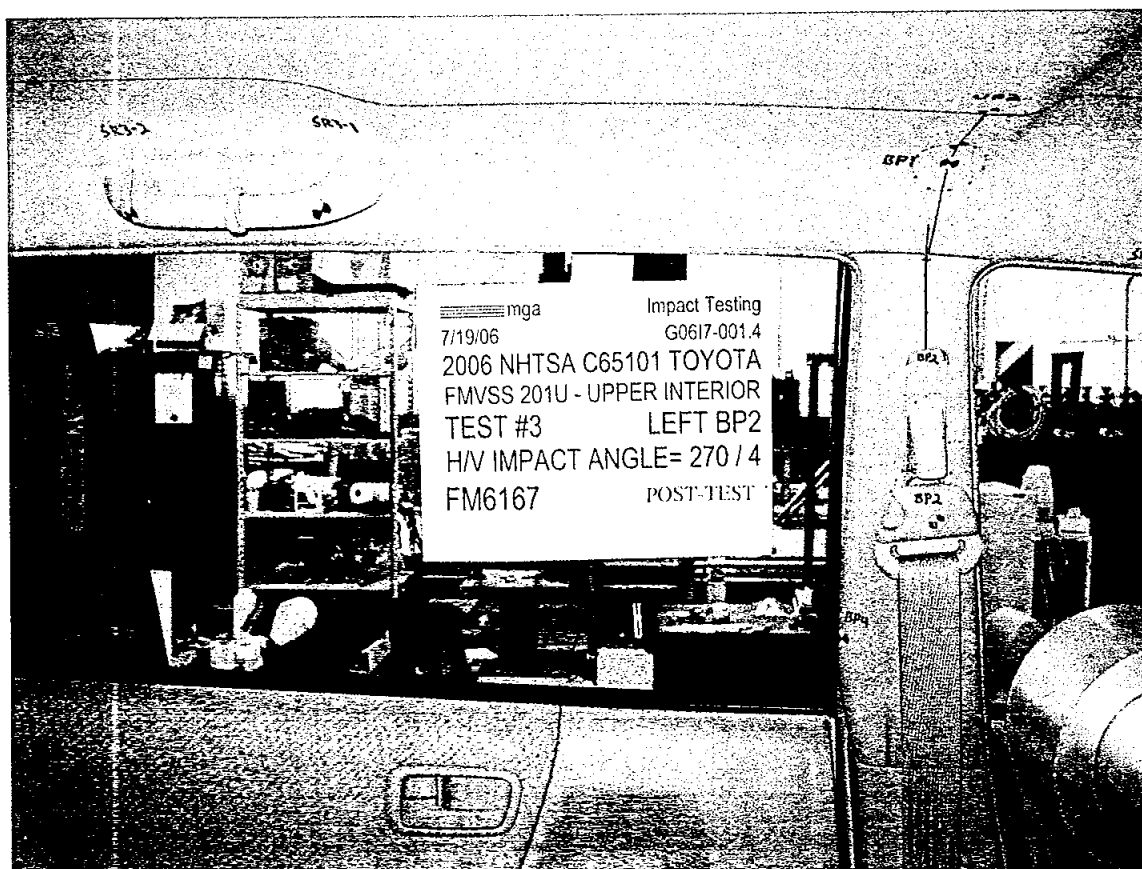
Test Date: 7/20/06

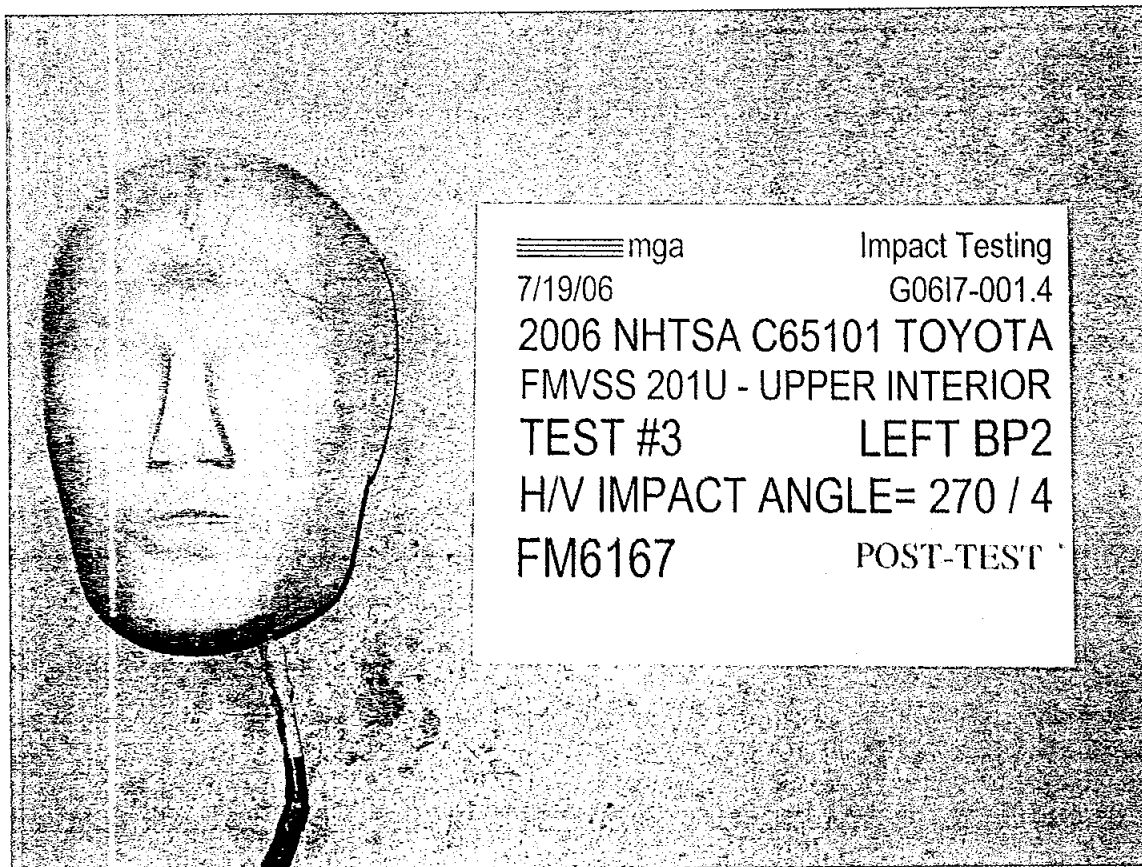
Model Year: 2006
Target: BP1
Vehicle Side: Right
Horz/Vert Angle: 90/15

HIC(d) = 678, HIC = 679, Delta T = 7.2 msec









SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.4 VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#3

Target (Vehicle Side): BP2 Left

Temperature:25C

MGA Test Reference No.:FM6167

Humidity:41%

Approach Horizontal Angles:270°

Time of Test:4:45 PM

Approach Vertical Angles:4°

FMH Serial No:[039]

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
562	524	9.3	24.1	15	3 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J13753	-103.6	1.55	1.55
Y	6	J22700	94.4	1.52	1.53
Z	7	J32734	95.5	1.46	1.46

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

No visible damage.

Recorded By: Matt Kerr Approved By*: Heena A. Kalita Date: 7/19/06
 *Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.4

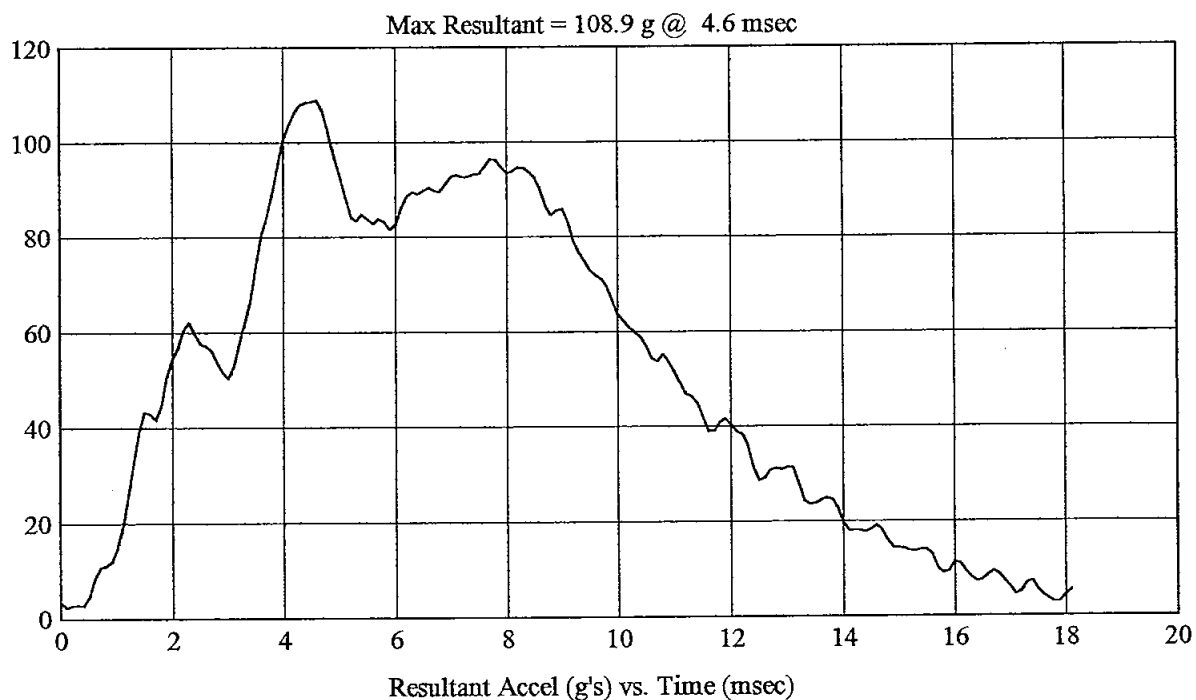
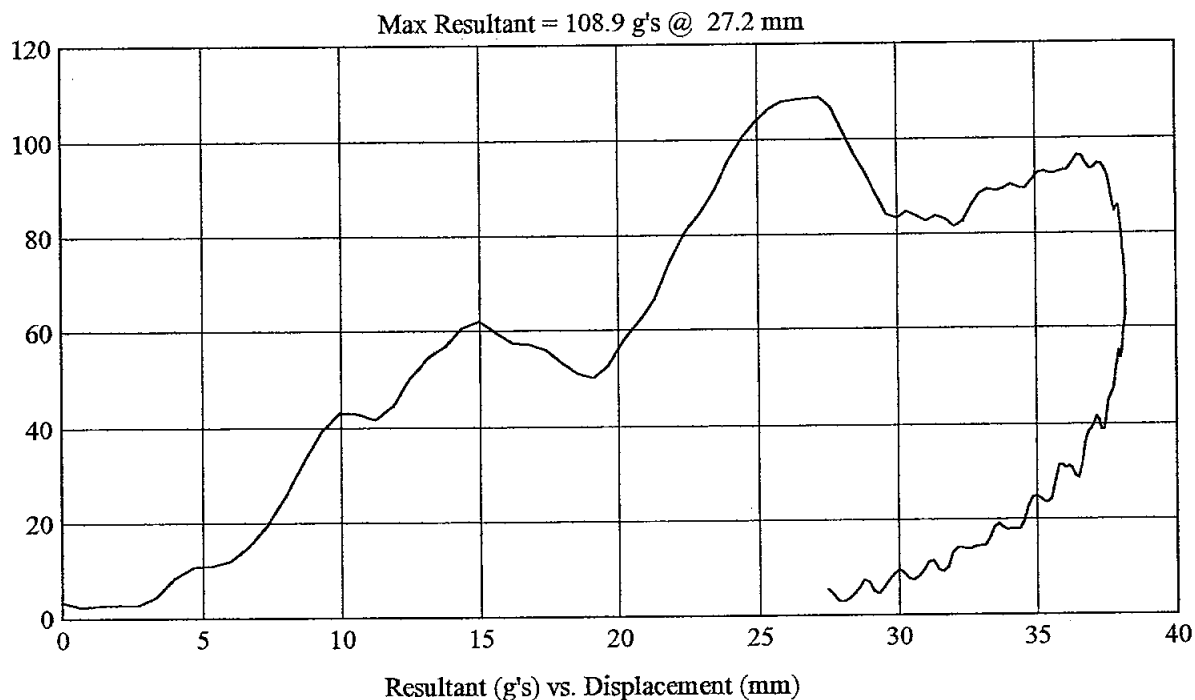
Customer: NHTSA
Test # 3
FM6167
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/19/06

Model Year: 2006
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/4

HIC(d) = 562, HIC = 524, Delta T = 9.3 msec



FMH
G06I7-001.4

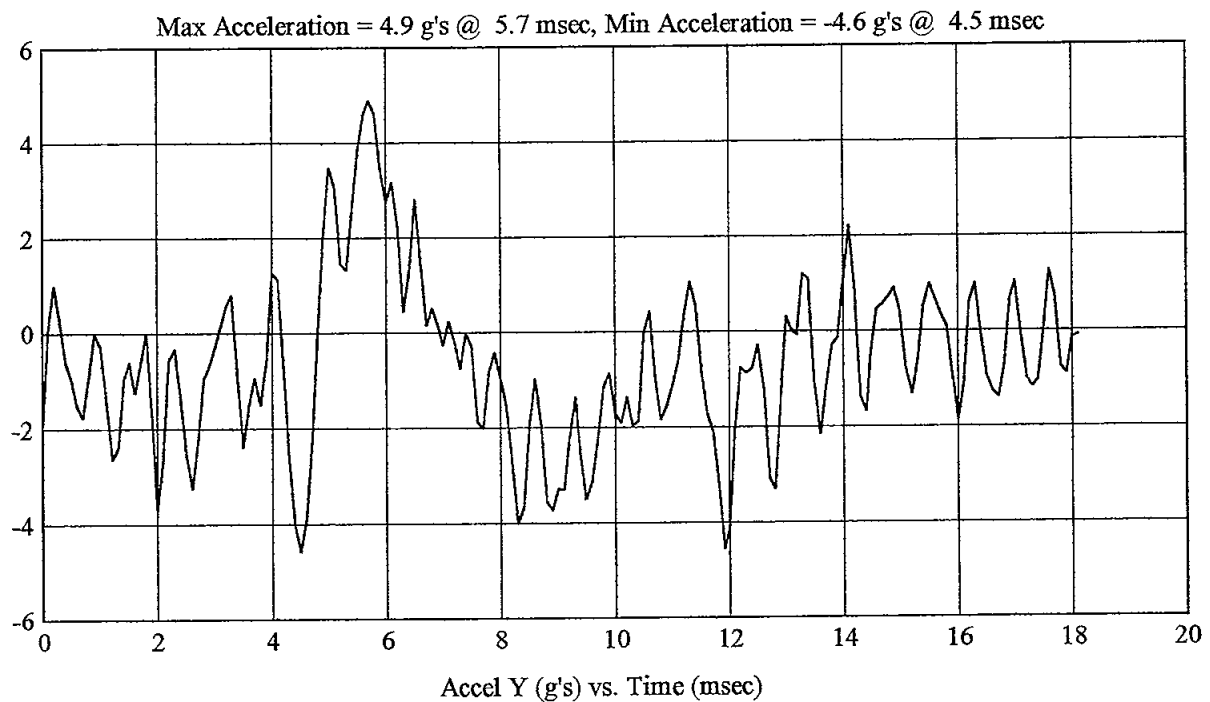
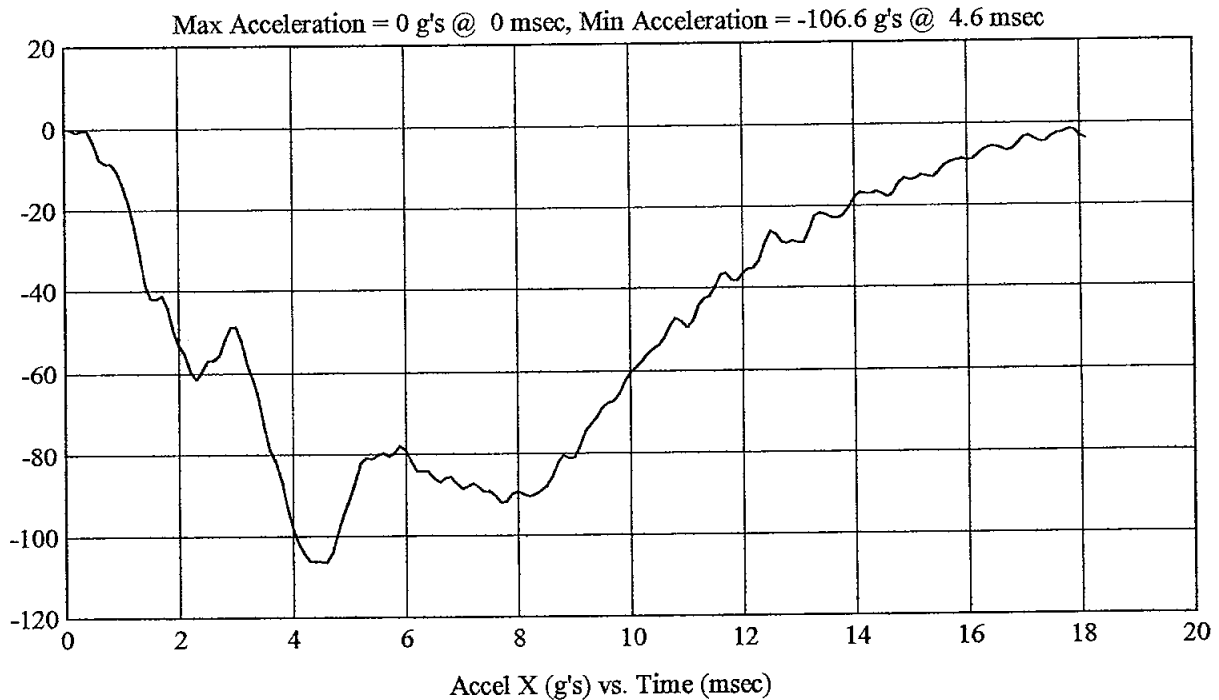
Customer: NHTSA
Test # 3
FM6167
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/19/06

Model Year: 2006
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/4

HIC(d) = 562, HIC = 524, Delta T = 9.3 msec



FMH
G06I7-001.4

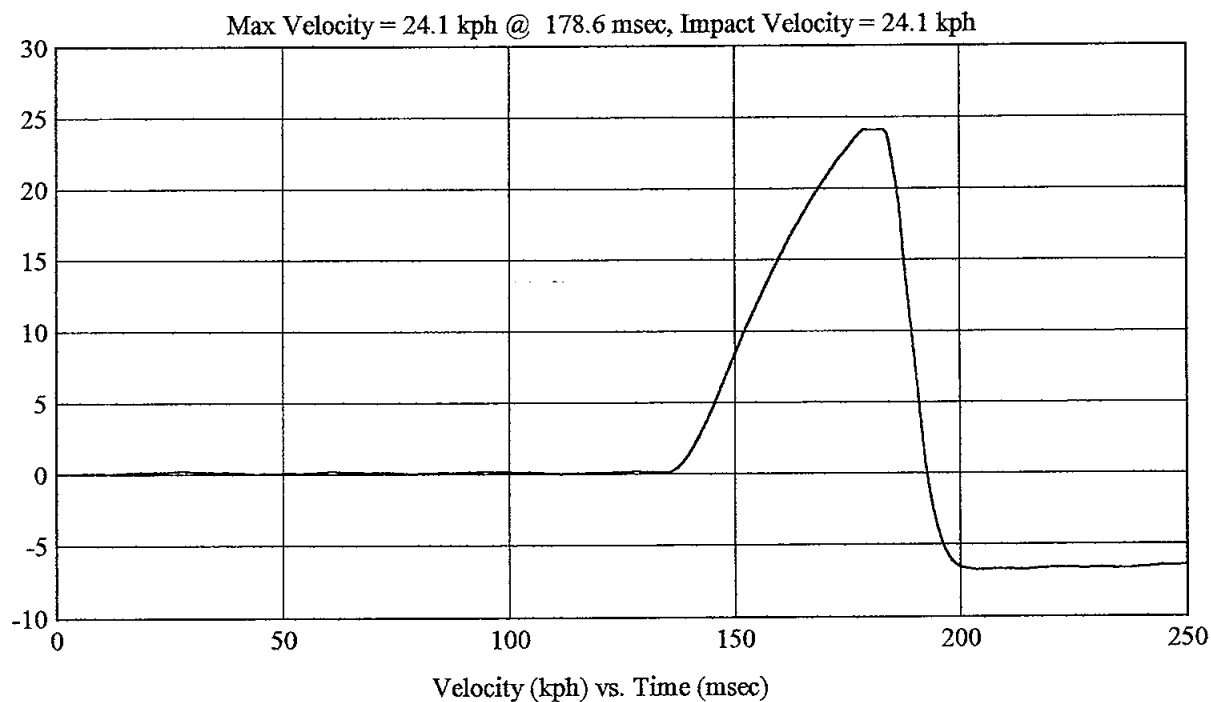
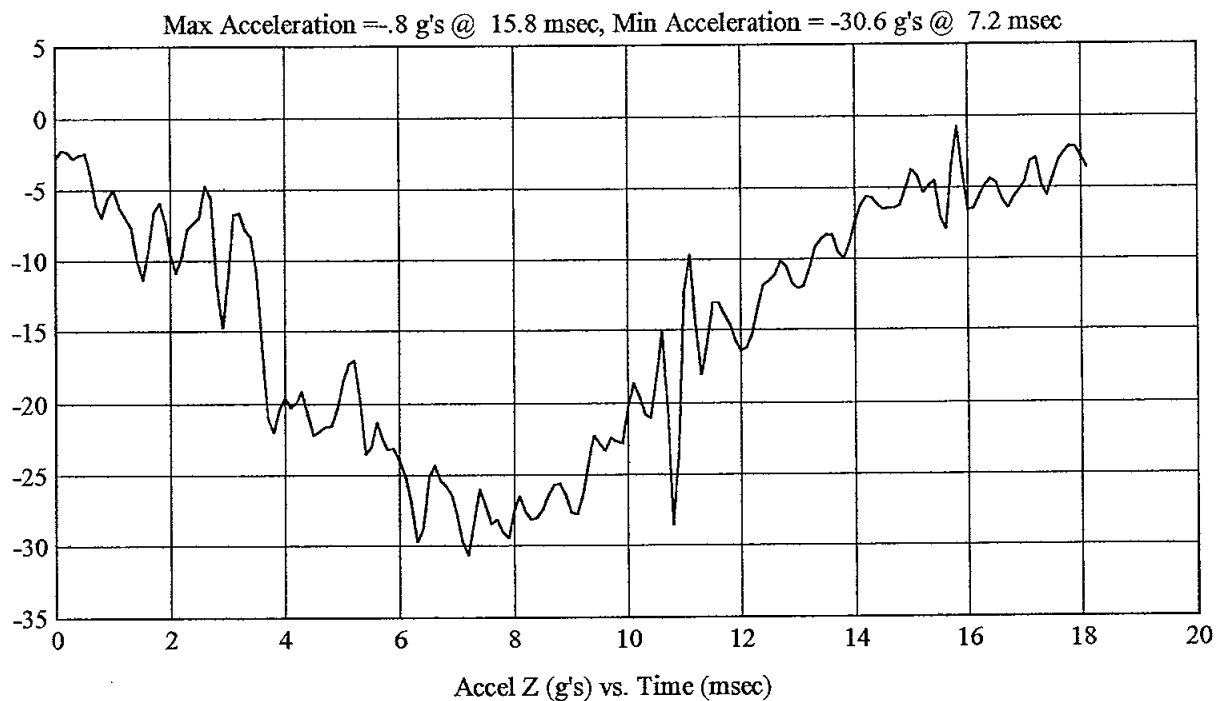
Customer: NHTSA
Test # 3
FM6167
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/19/06

Model Year: 2006
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/4

HIC(d) = 562, HIC = 524, Delta T = 9.3 msec



FMH
G06I7-001.4

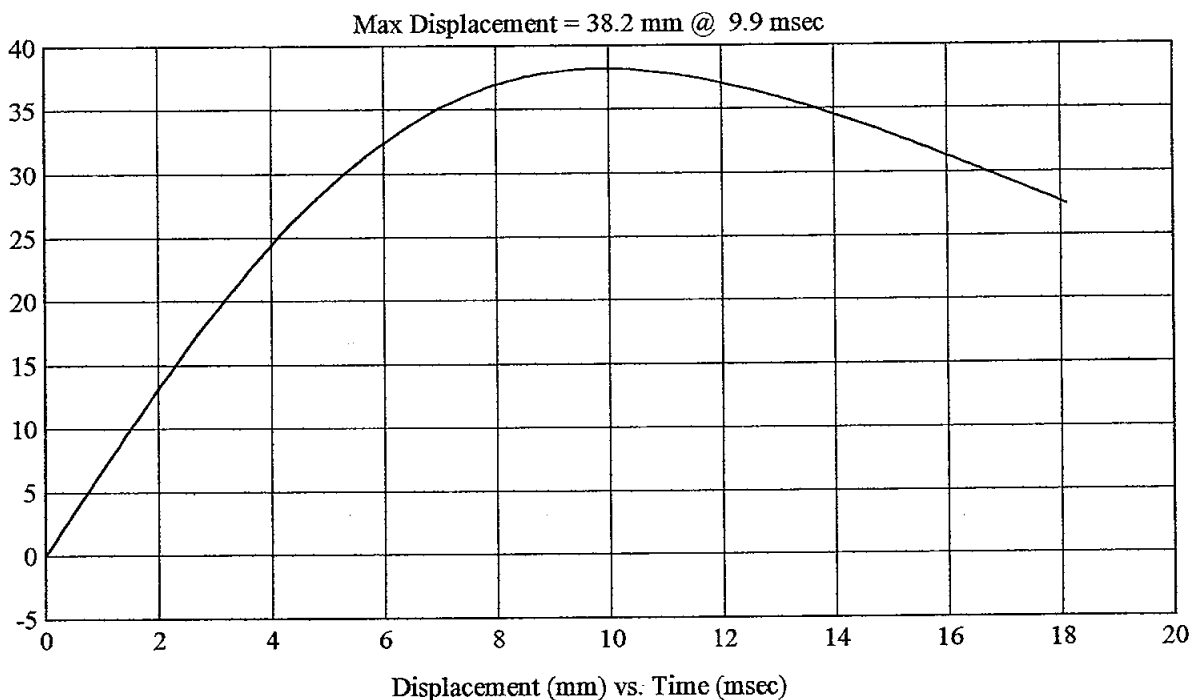
Customer: NHTSA
Test # 3
FM6167
Additional Desc: N/A

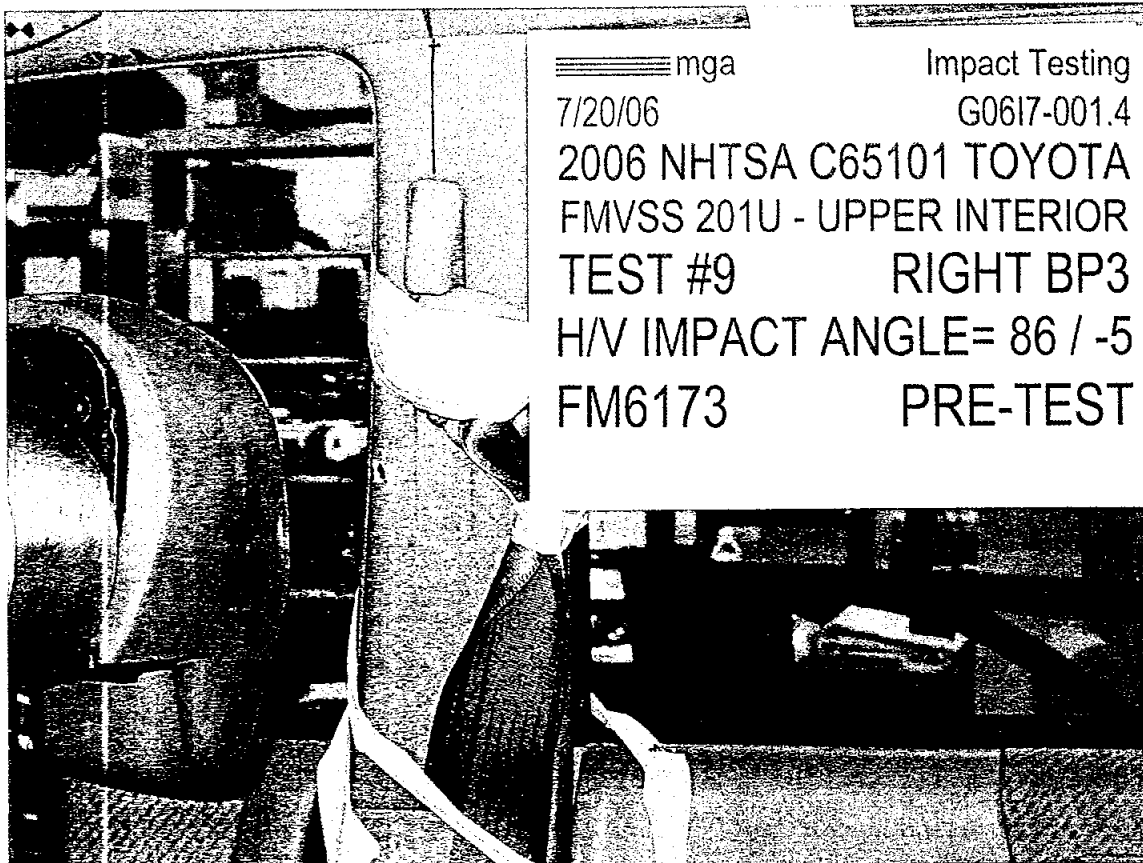
Vehicle Program : Toyota

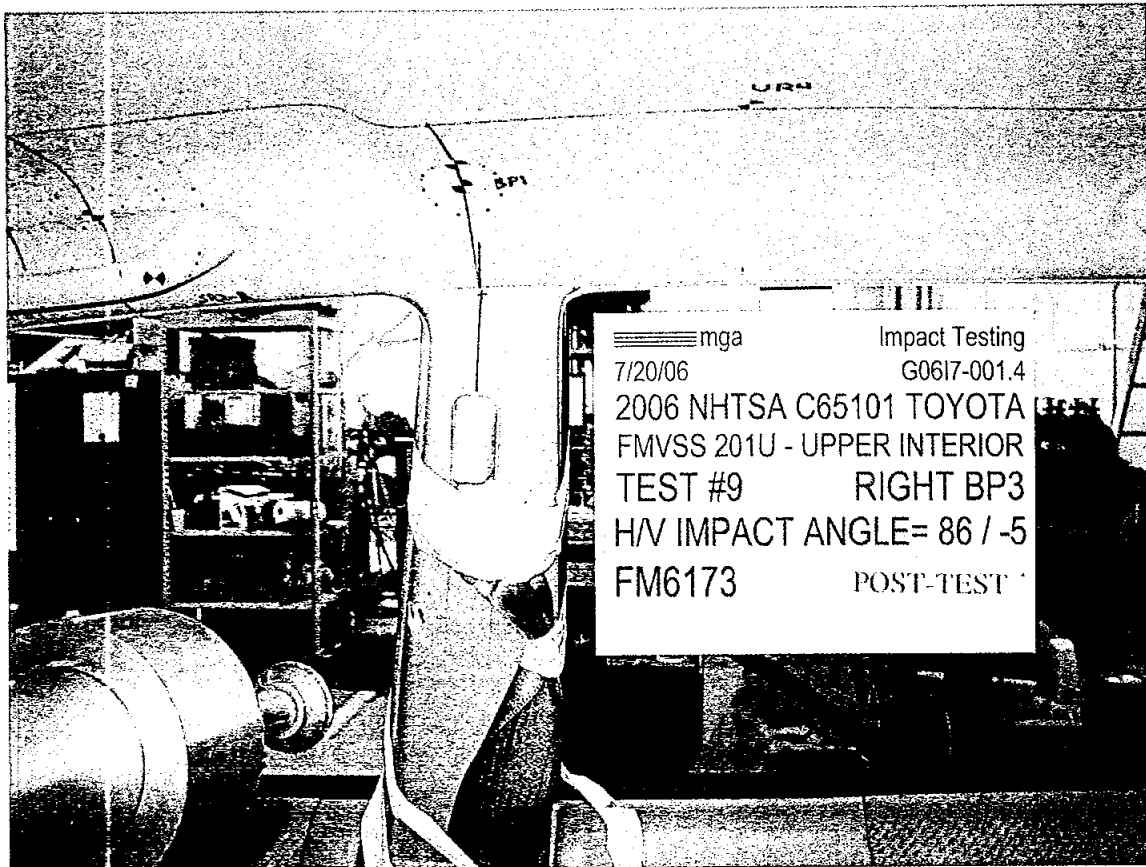
Test Date: 7/19/06

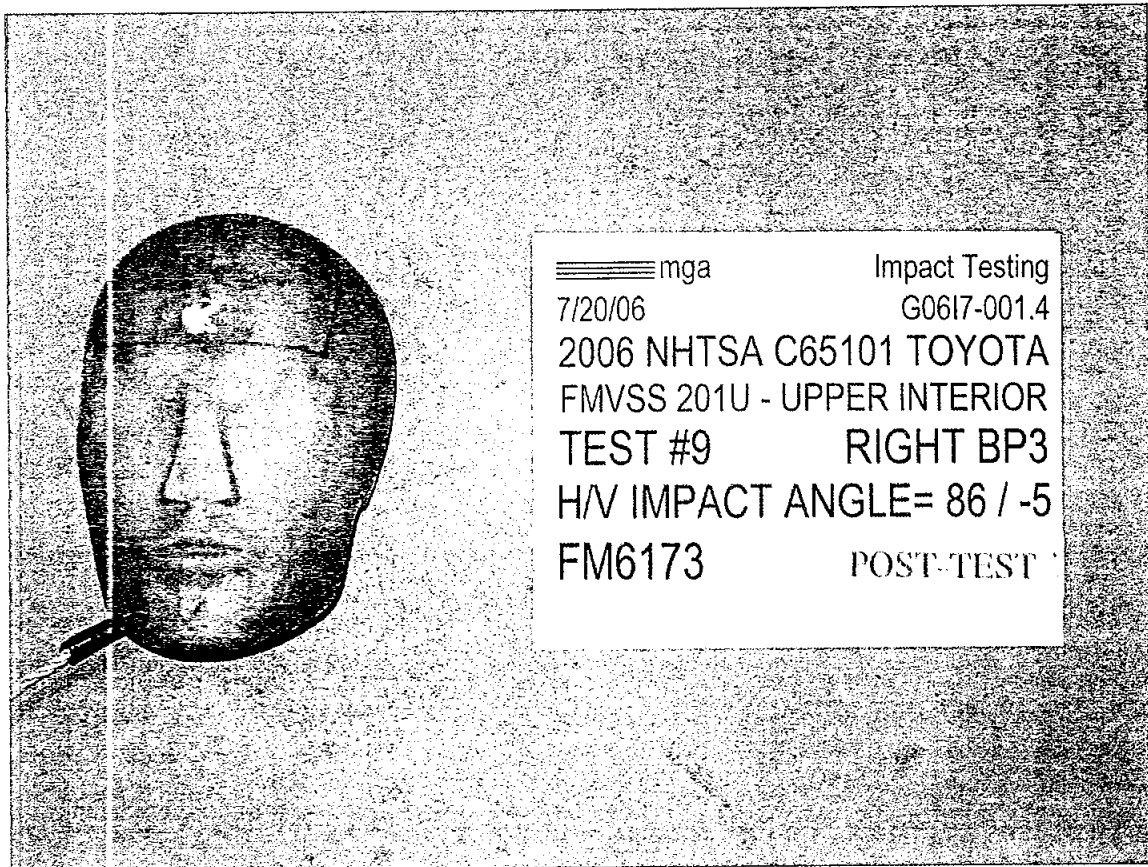
Model Year: 2006
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/4

HIC(d) = 562, HIC = 524, Delta T = 9.3 msec









SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.4 VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#9

Target (Vehicle Side): BP3 Right

Temperature:25C

MGA Test Reference No.:FM6173

Humidity:45%

Approach Horizontal Angles:86°

Time of Test:3:30 PM

Approach Vertical Angles:-5°

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
542	498	10.2	23.9	10	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108.8	1.55	1.55
Y	6	J36193	102.7	1.53	1.53
Z	7	J36353	97.2	1.45	1.45

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

No visible damage.

Recorded By: Matt Kerr Approved By*: Heena A. Kalita Date: 7/20/06
 *Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.4

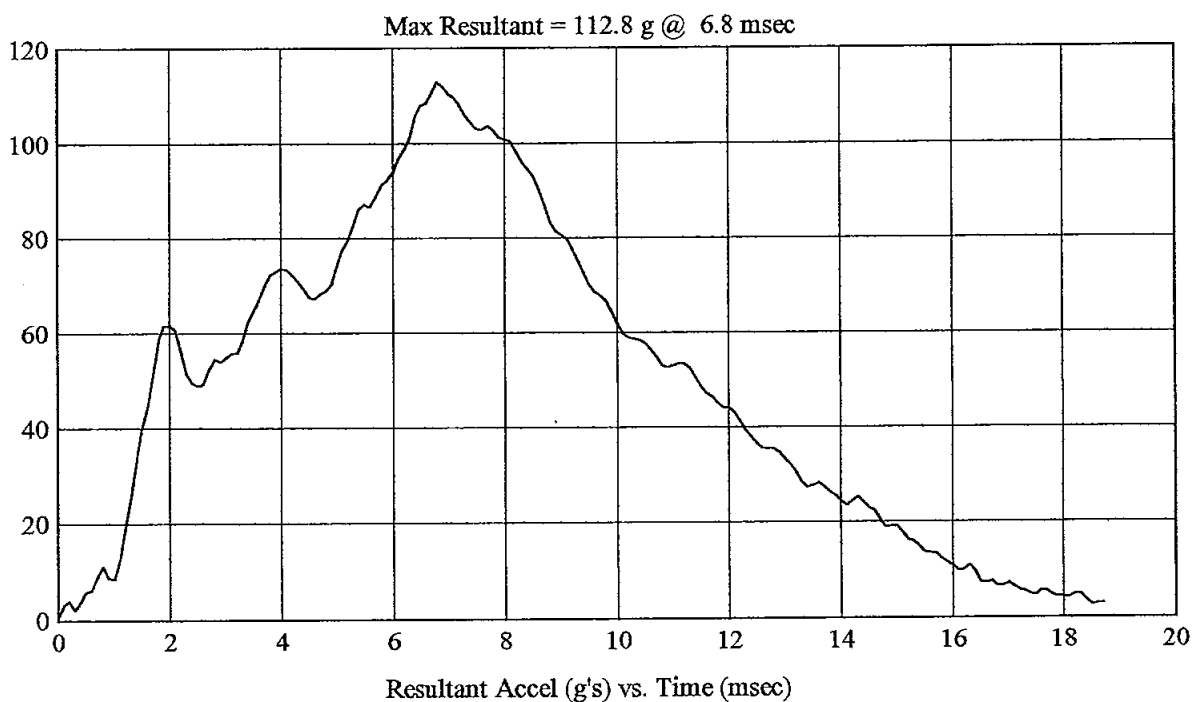
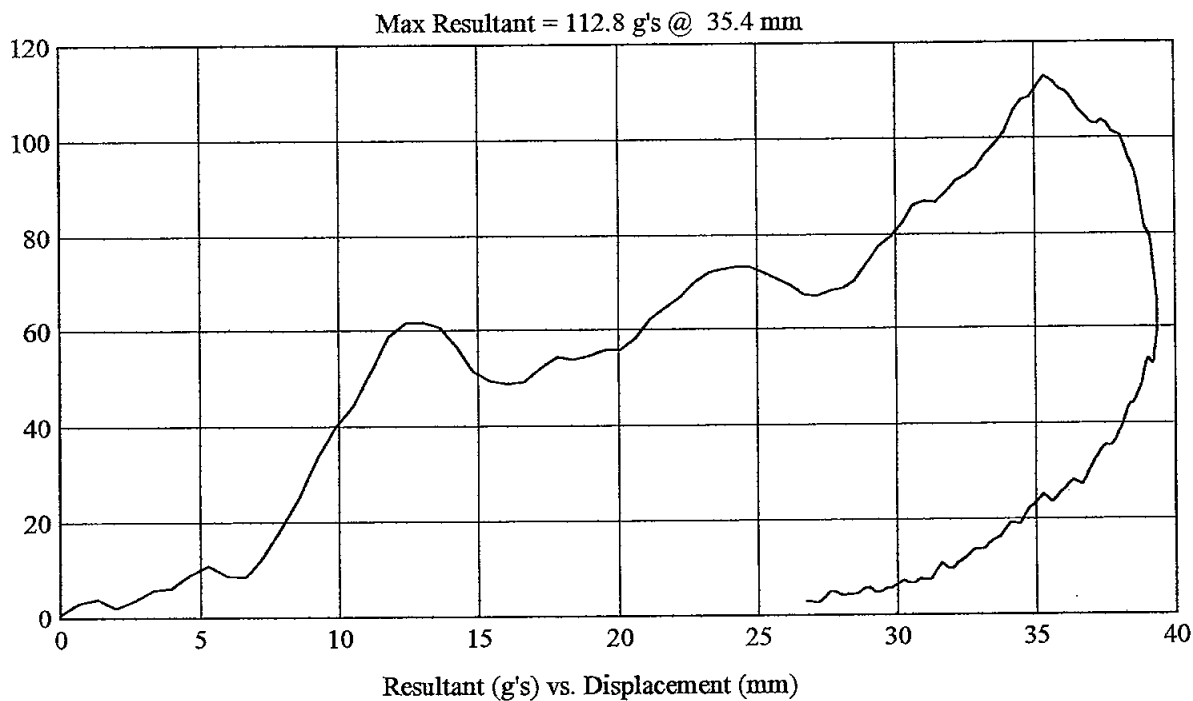
Customer: NHTSA
Test # 9
FM6173
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: BP3
Vehicle Side: Right
Horz/Vert Angle: 86/-5

HIC(d) = 542, HIC = 498, Delta T = 10.2 msec



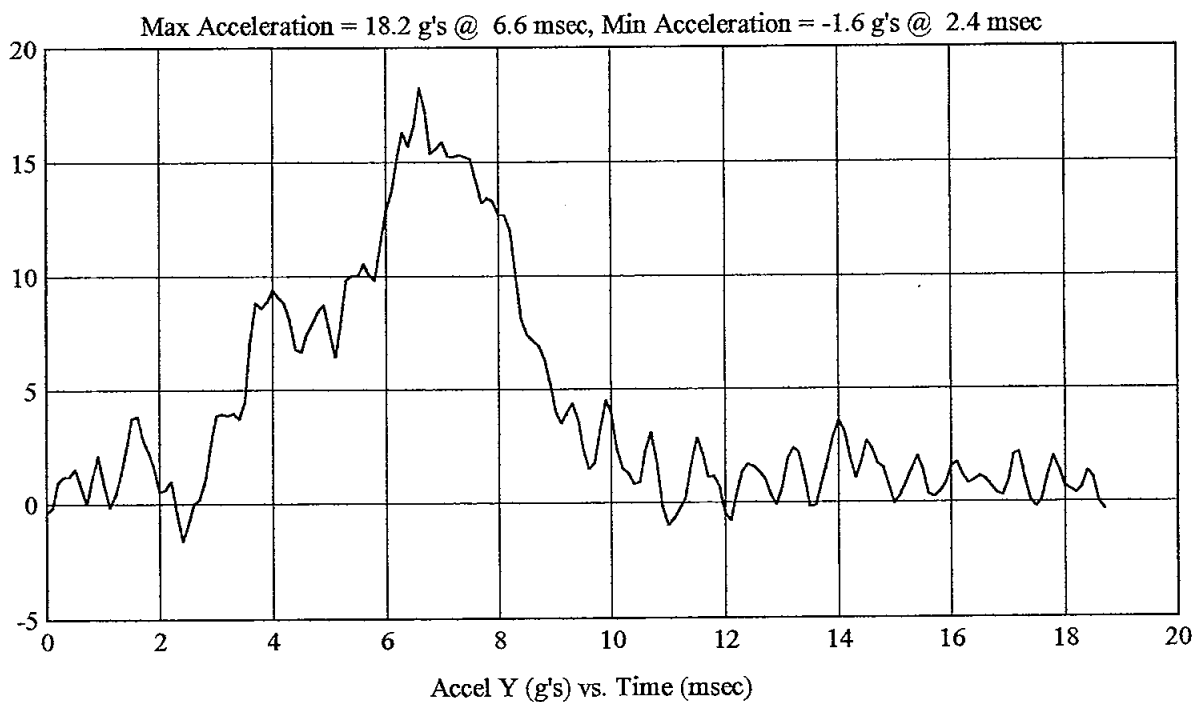
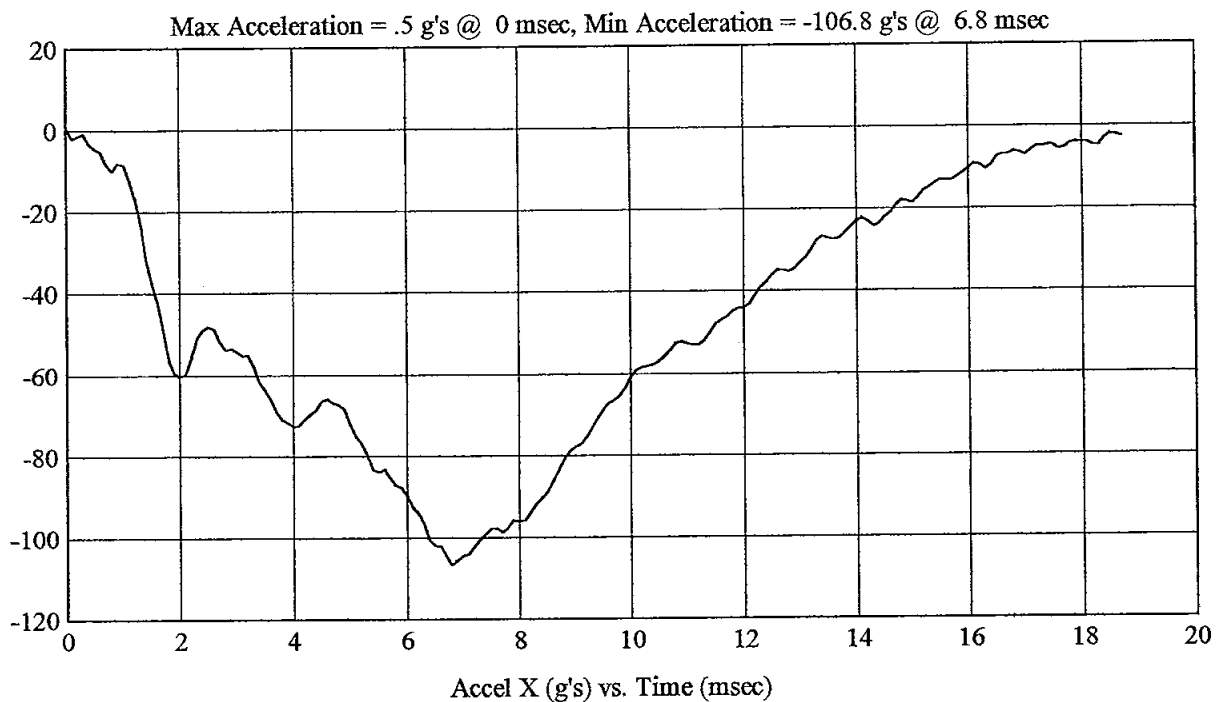
FMH
G0617-001.4Customer: NHTSA
Test # 9
FM6173
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: BP3
Vehicle Side: Right
Horz/Vert Angle: 86/-5

HIC(d) = 542, HIC = 498, Delta T = 10.2 msec



FMH
G06I7-001.4

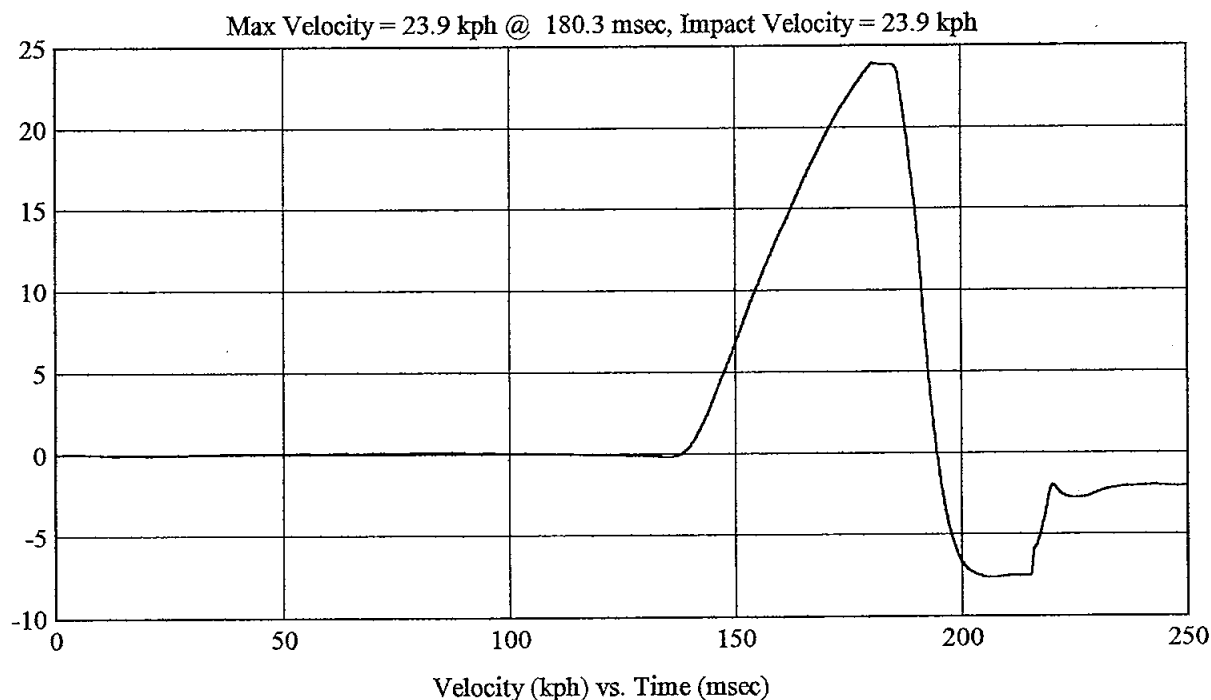
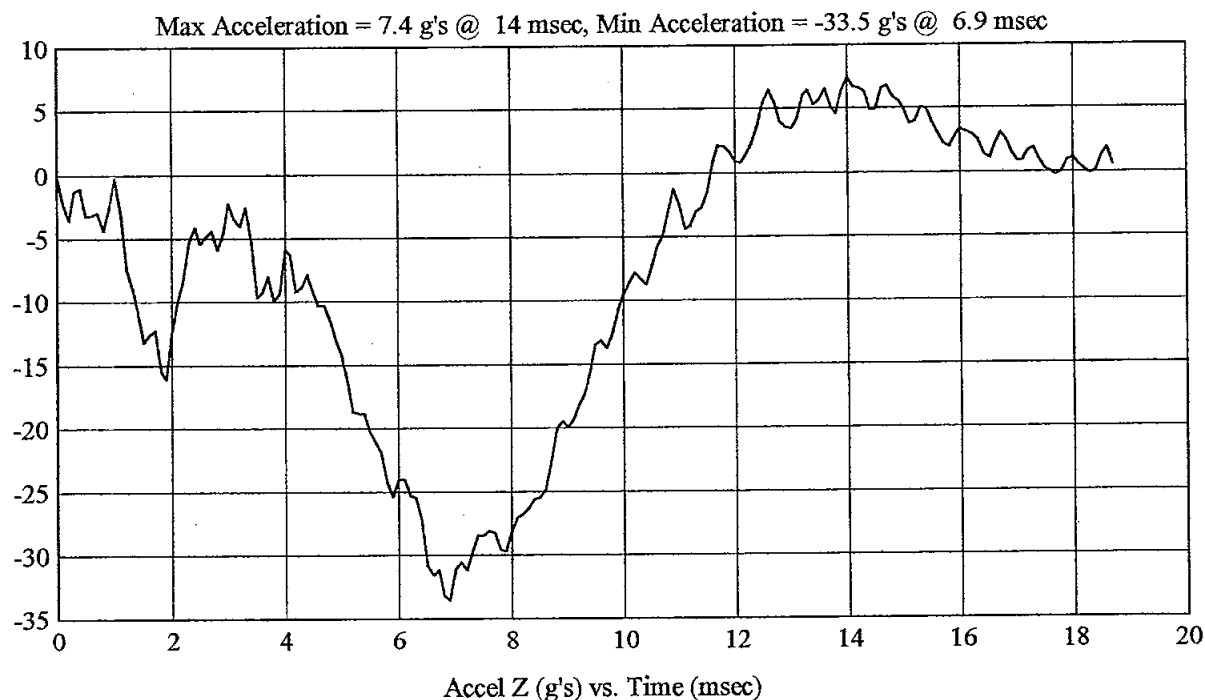
Customer: NHTSA
Test # 9
FM6173
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: BP3
Vehicle Side: Right
Horz/Vert Angle: 86/-5

HIC(d) = 542, HIC = 498, Delta T = 10.2 msec



FMH
G06I7-001.4

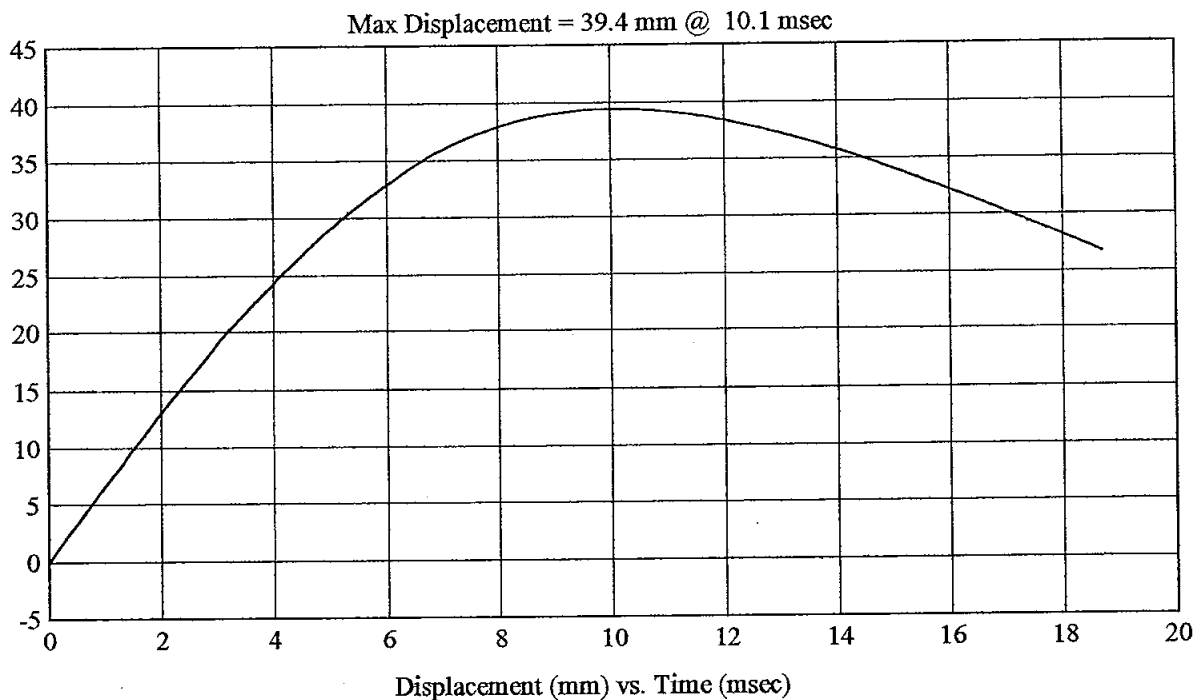
Customer: NHTSA
Test # 9
FM6173
Additional Desc: N/A

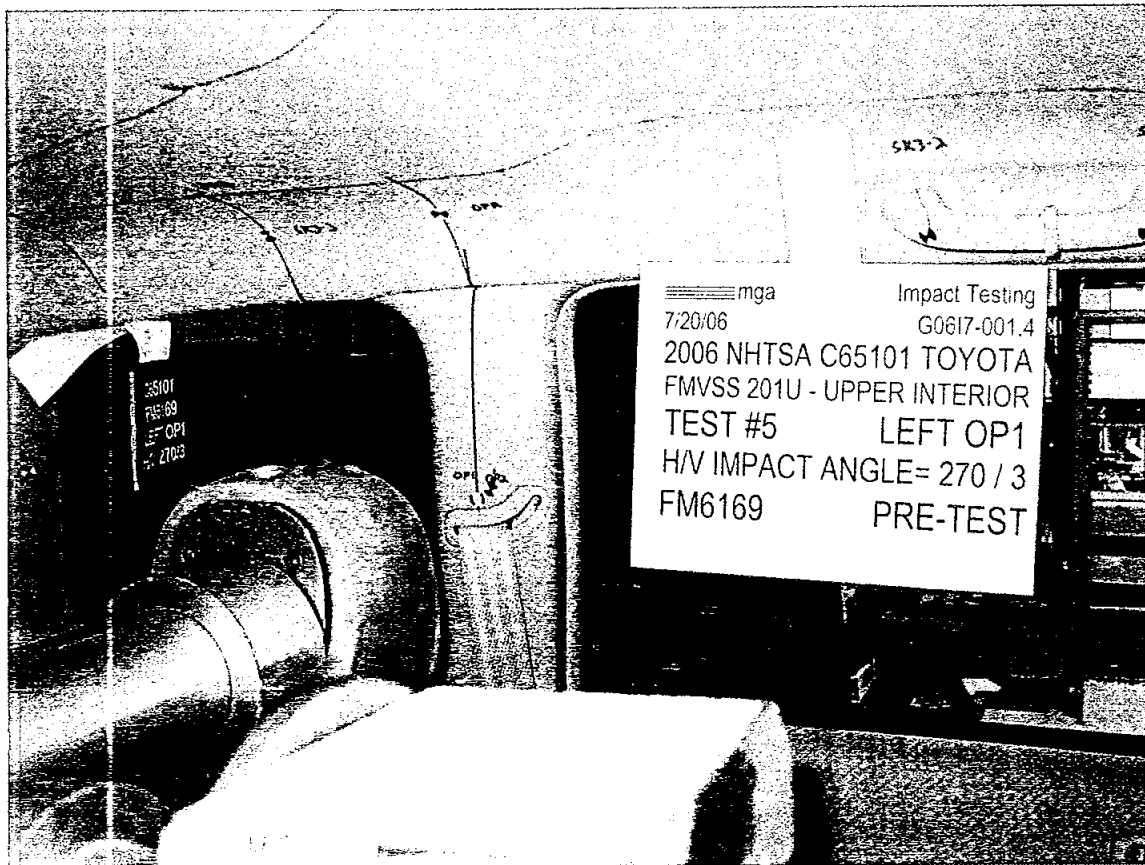
Vehicle Program : Toyota

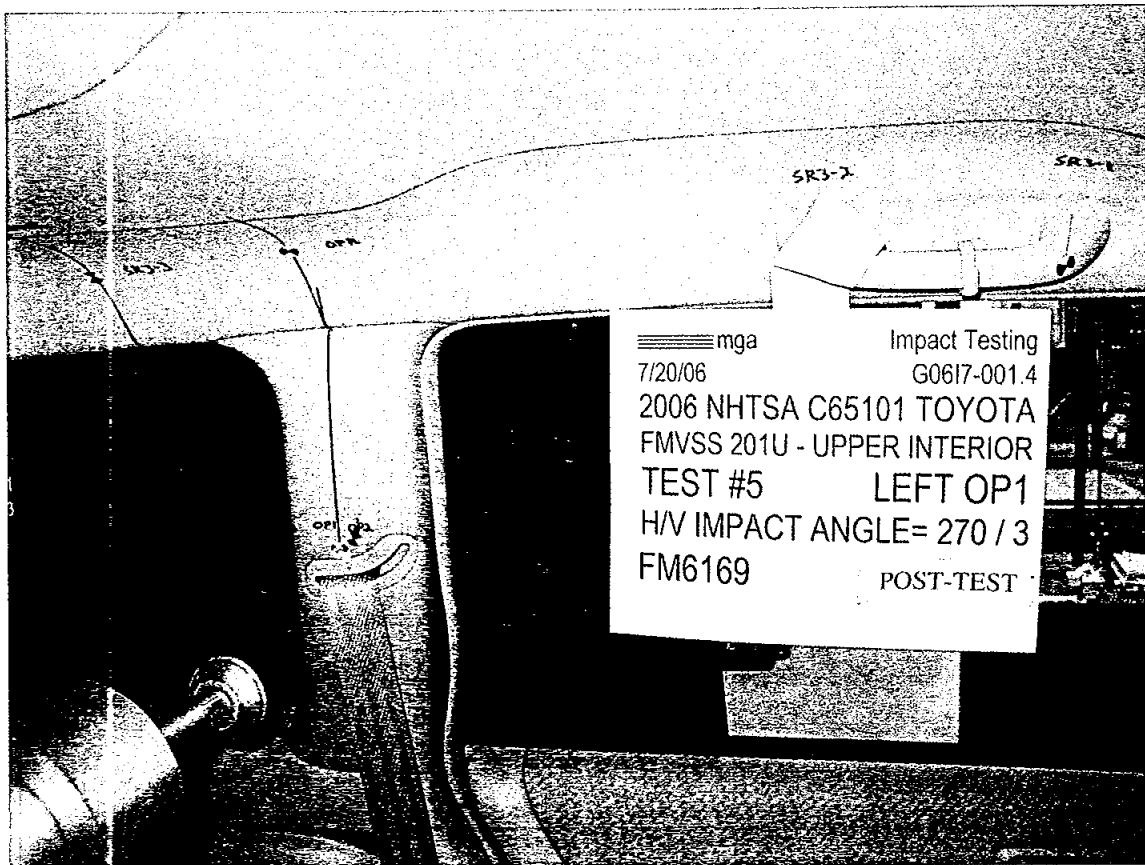
Test Date: 7/20/06

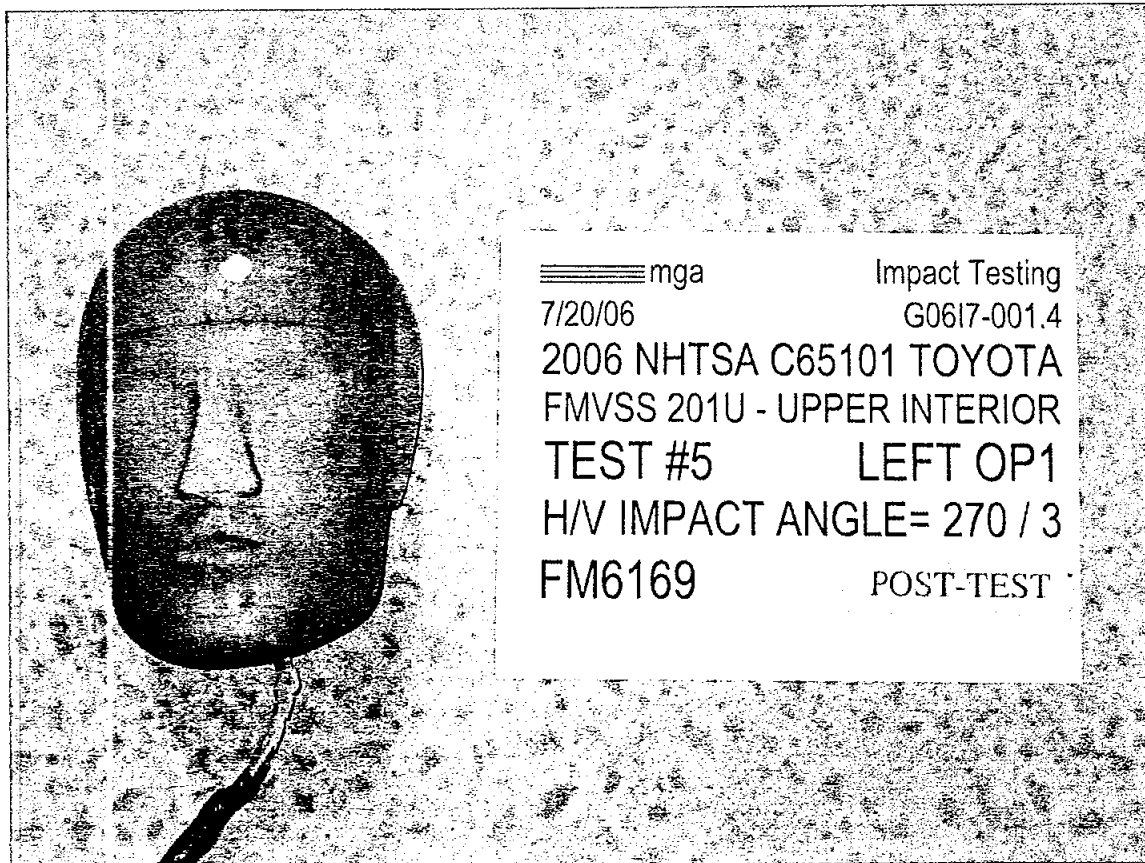
Model Year: 2006
Target: BP3
Vehicle Side: Right
Horz/Vert Angle: 86/-5

HIC(d) = 542, HIC = 498, Delta T = 10.2 msec









SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0617-001.4

VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#5

Target (Vehicle Side): OP1 Left

Temperature:24C

MGA Test Reference No.:FM6169

Humidity:40%

Approach Horizontal Angles:270°

Time of Test: 9:15 AM

Approach Vertical Angles:3°

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
525	475	7.8	23.7	25	10 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-91.4	1.54	1.54
Y	6	J35919	94.4	1.53	1.53
Z	7	J22664	94.3	1.45	1.45

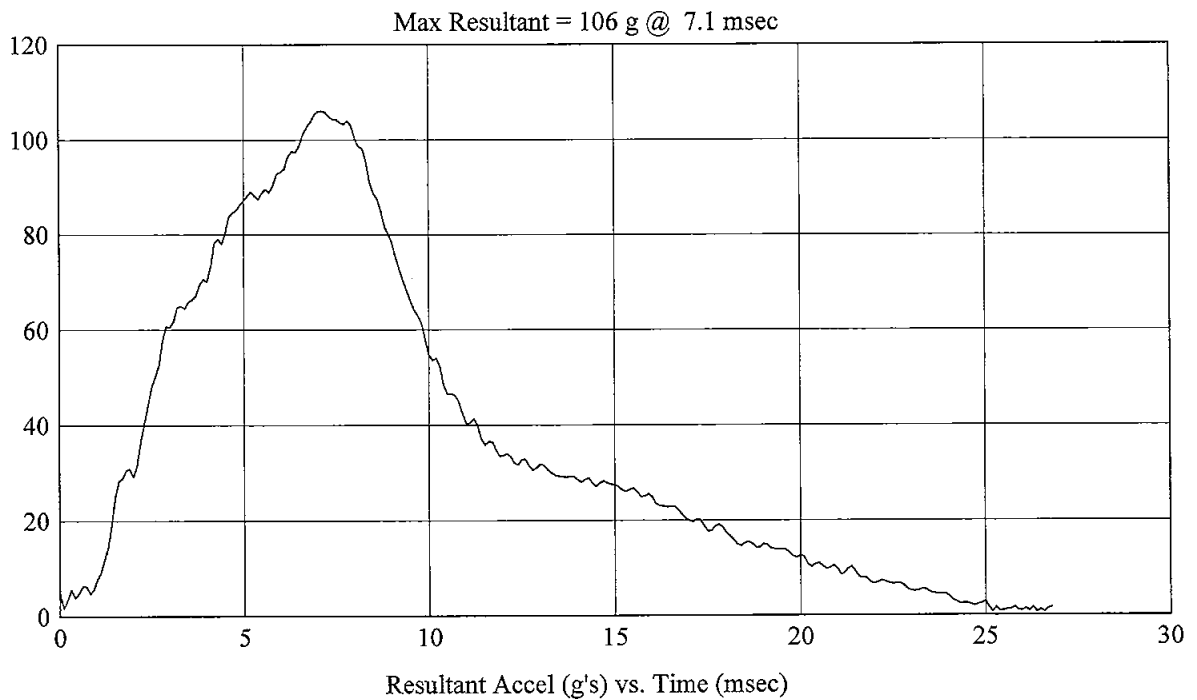
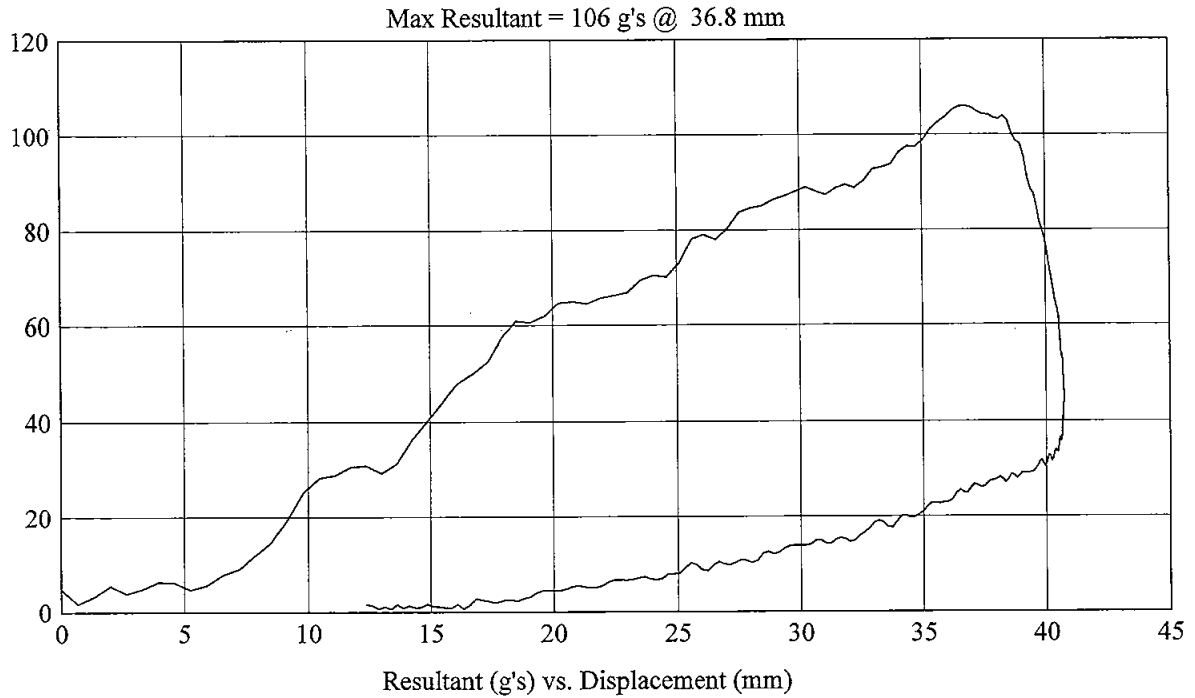
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage.

Recorded By: Matt Kerr Approved By*: Aileen A. Kalata Date: 7/20/06
 *Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.4Customer: NHTSA
Test # 5
FM6169
Additional Desc: N/AVehicle Program : Toyota
Test Date: 7/20/06Model Year: 2006
Target: OP1
Vehicle Side: Left
Horz/Vert Angle: 270/3

HIC(d) = 525, HIC = 475, Delta T = 7.8 msec



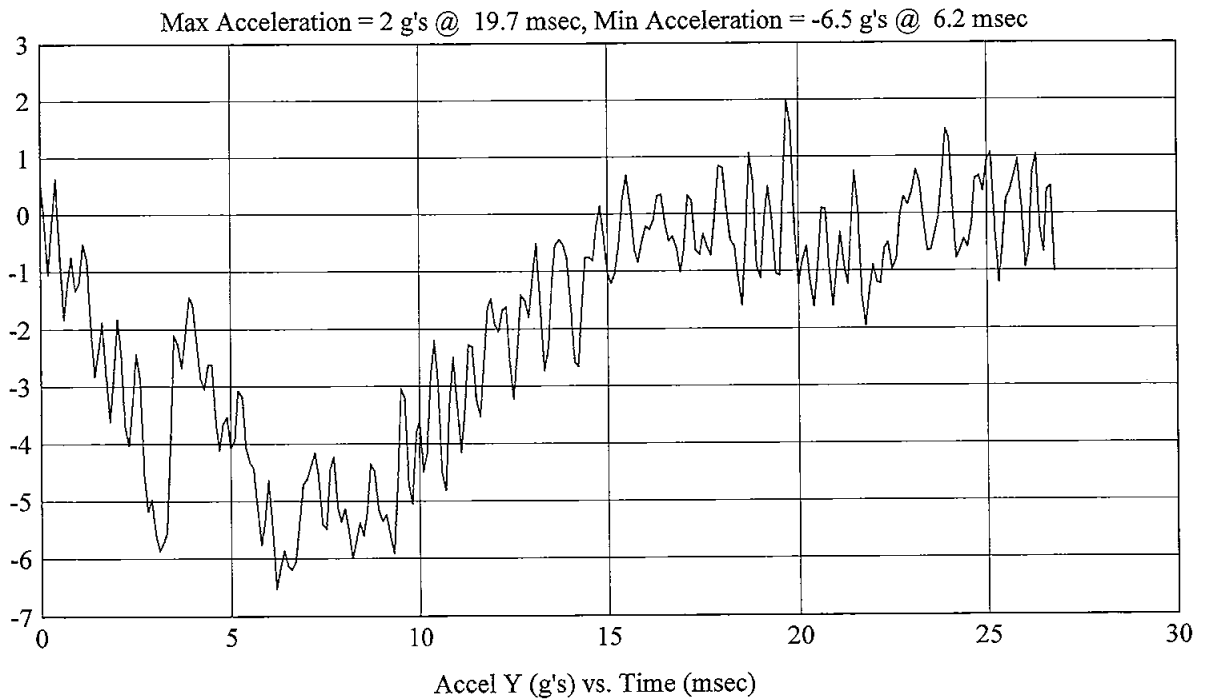
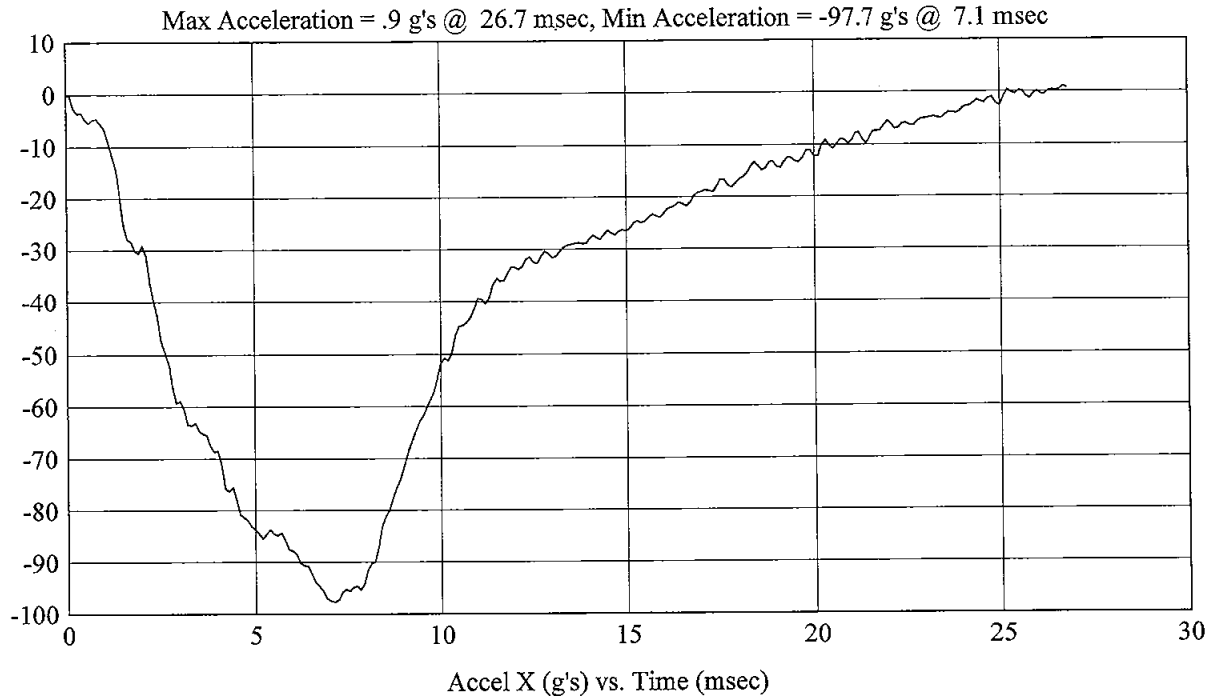
FMH
G06I7-001.4Customer: NHTSA
Test # 5
FM6169
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: OP1
Vehicle Side: Left
Horz/Vert Angle: 270/3

HIC(d) = 525, HIC = 475, Delta T = 7.8 msec



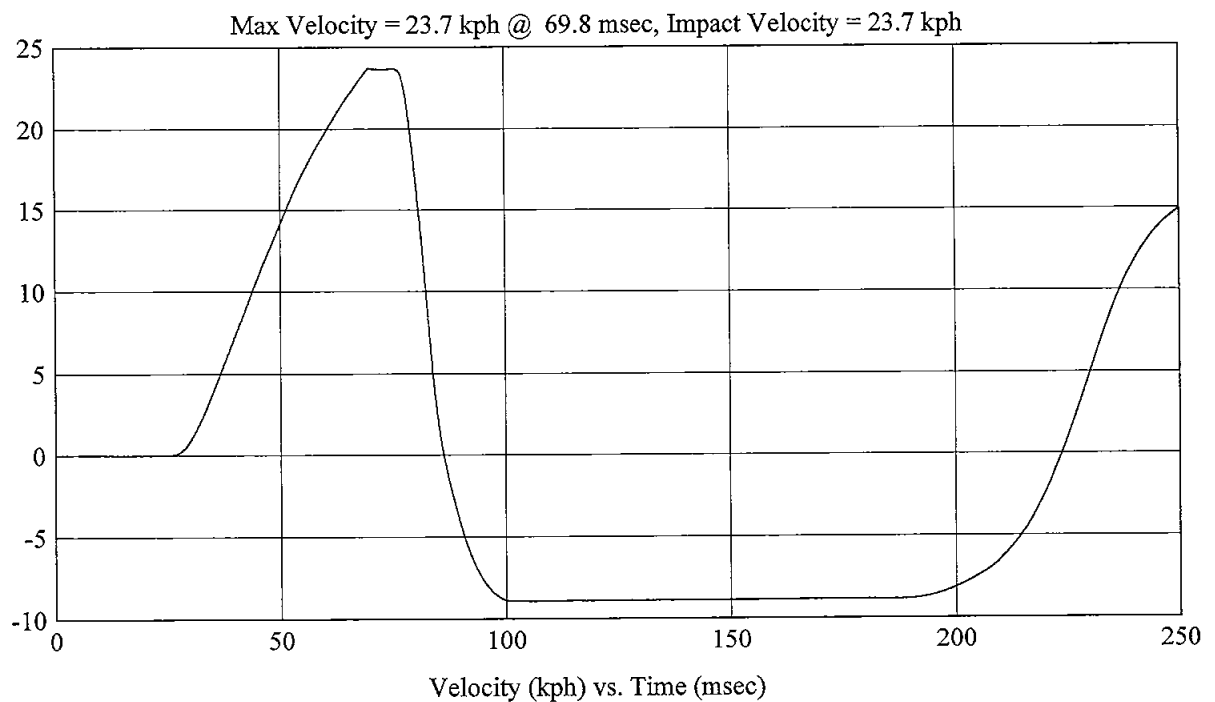
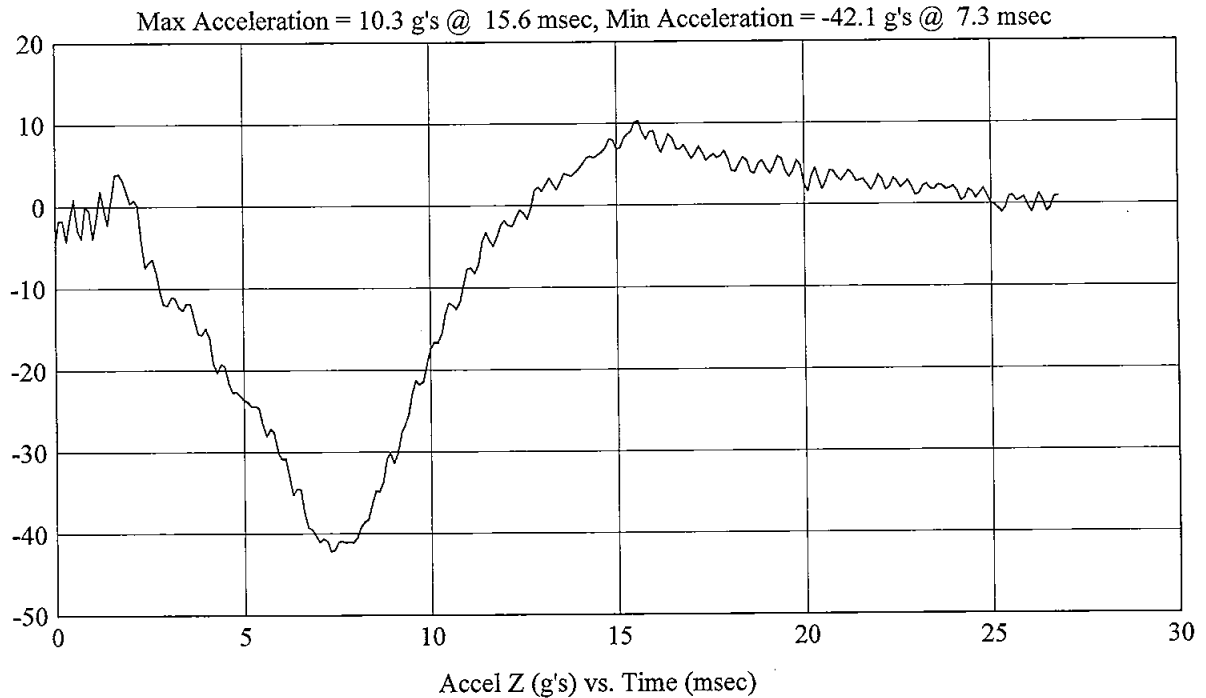
FMH
G06I7-001.4Customer: NHTSA
Test # 5
FM6169
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: OP1
Vehicle Side: Left
Horz/Vert Angle: 270/3

HIC(d) = 525, HIC = 475, Delta T = 7.8 msec



FMH
G06I7-001.4

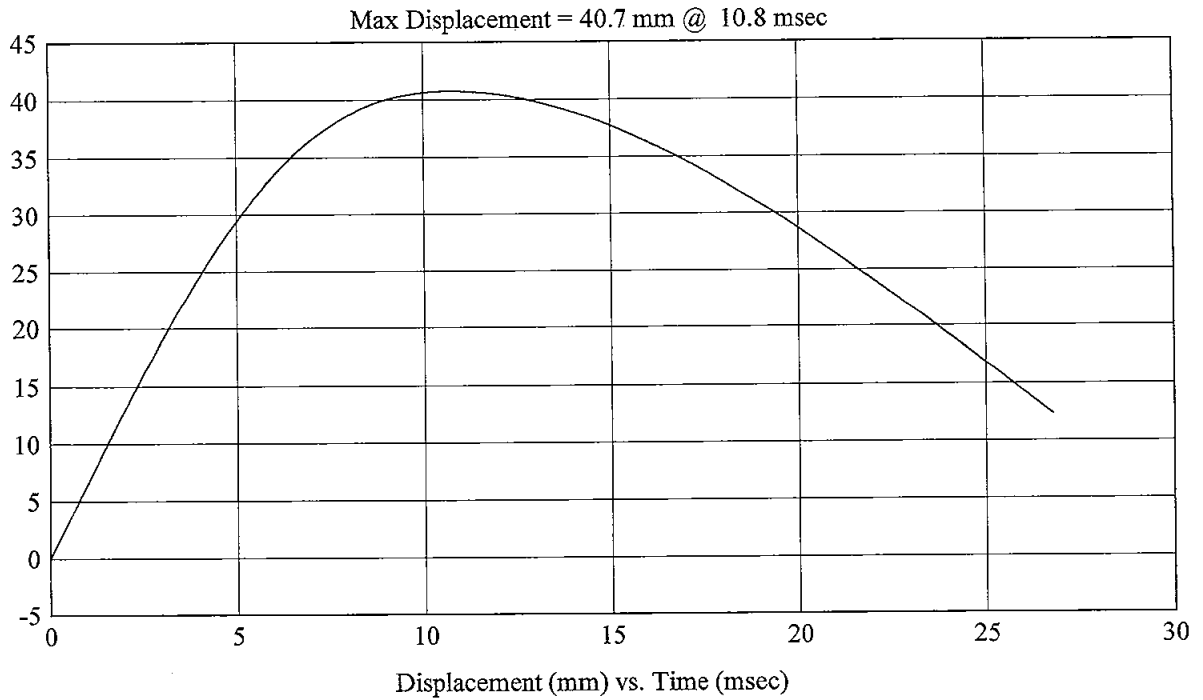
Customer: NHTSA
Test # 5
FM6169
Additional Desc: N/A

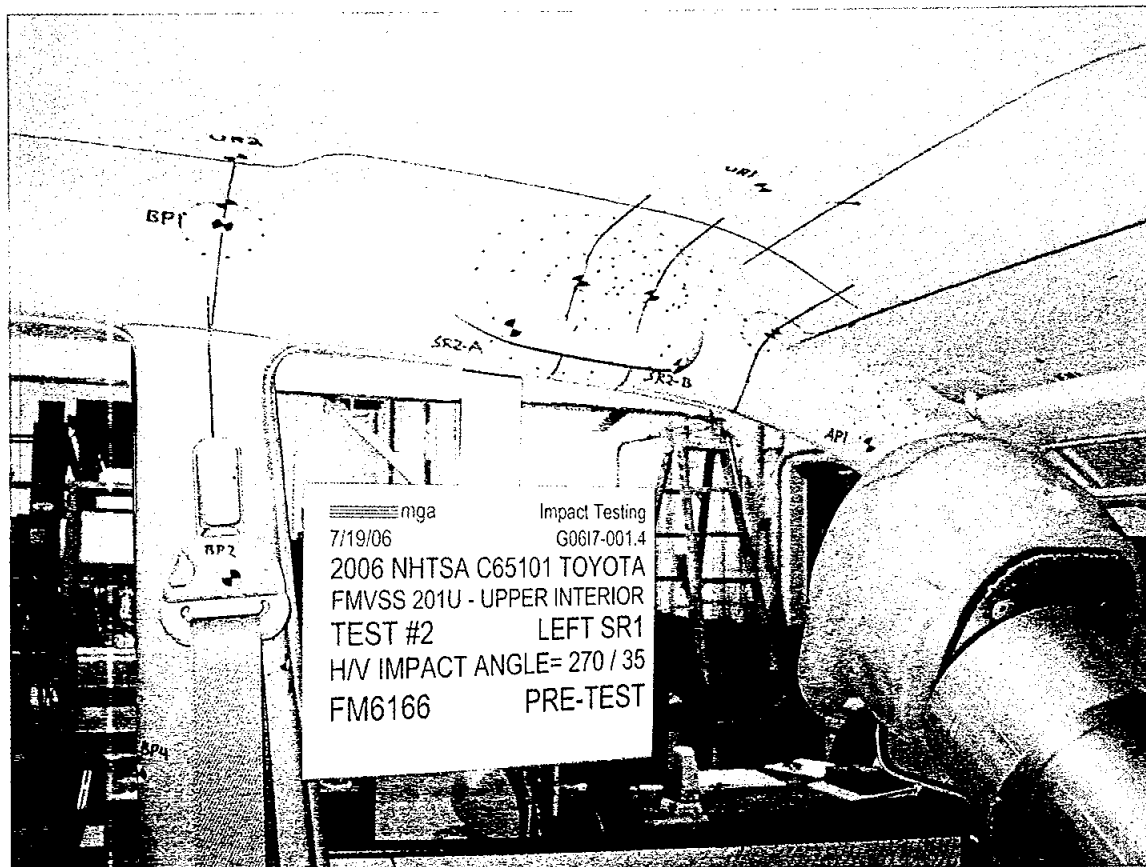
Vehicle Program : Toyota

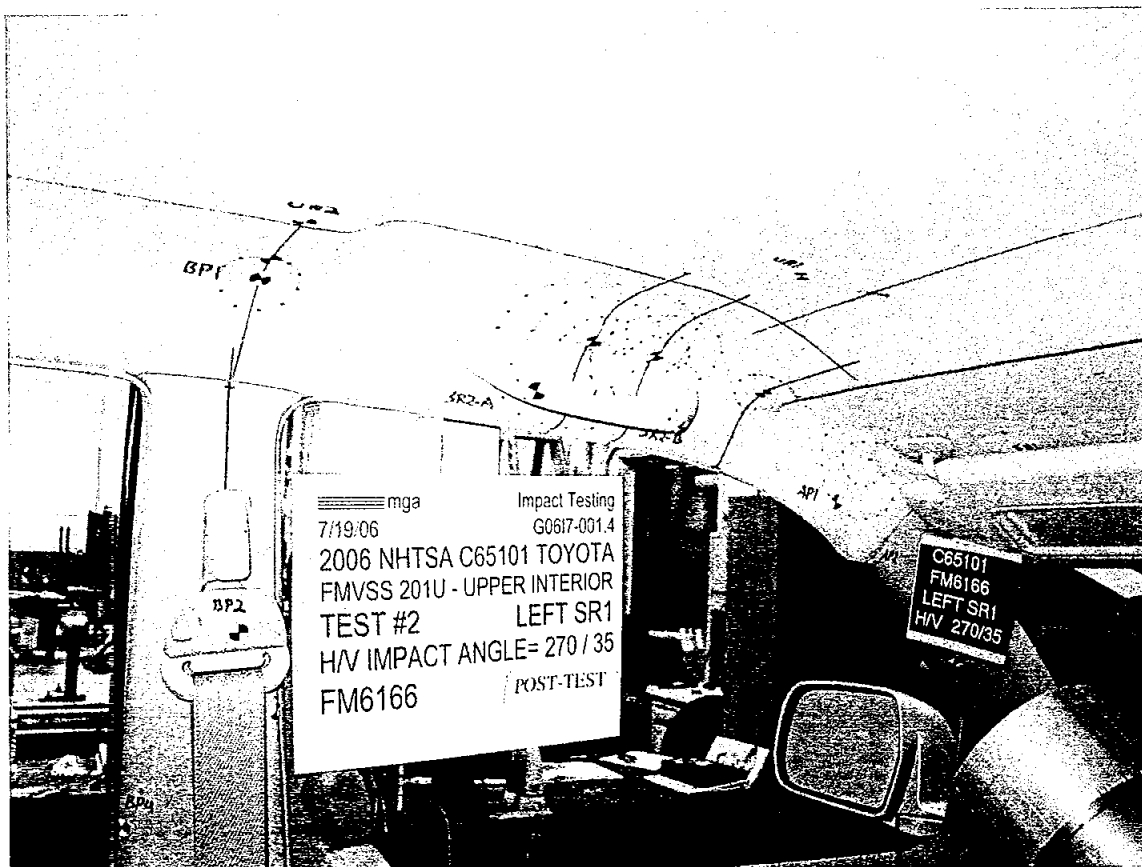
Test Date: 7/20/06

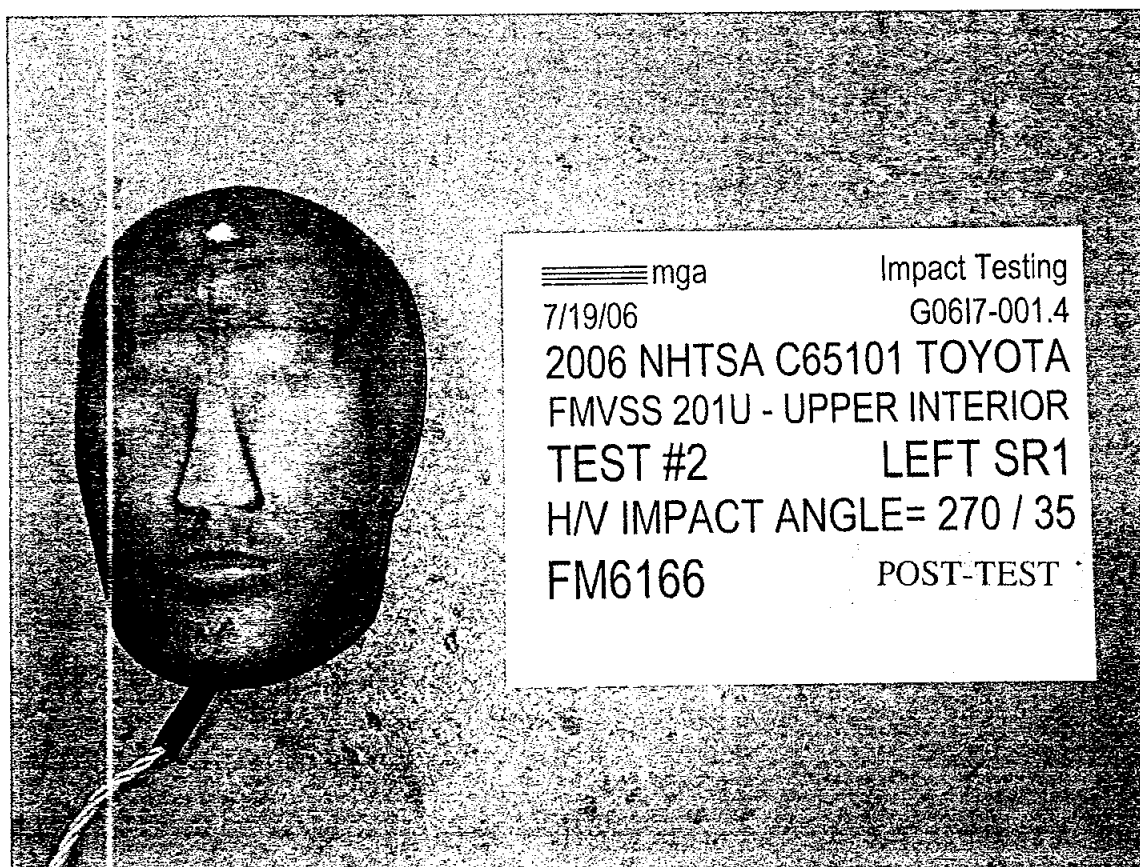
Model Year: 2006
Target: OP1
Vehicle Side: Left
Horz/Vert Angle: 270/3

HIC(d) = 525, HIC = 475, Delta T = 7.8 msec









SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.4

VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#2

Target (Vehicle Side): SR1 Left

Temperature:25C

MGA Test Reference No.:FM6166

Humidity:41%

Approach Horizontal Angles:270°

Time of Test:4:00 PM

Approach Vertical Angles:35°

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
841	894	6.2	24.2	47	0

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108.8	1.55	1.54
Y	6	J36193	102.7	1.54	1.53
Z	7	J36353	97.2	1.44	1.46

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

Headliner deformation.

Recorded By: Matt Kerr Approved By*: Heena A. Kalita Date: 7/19/06
 *Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.4

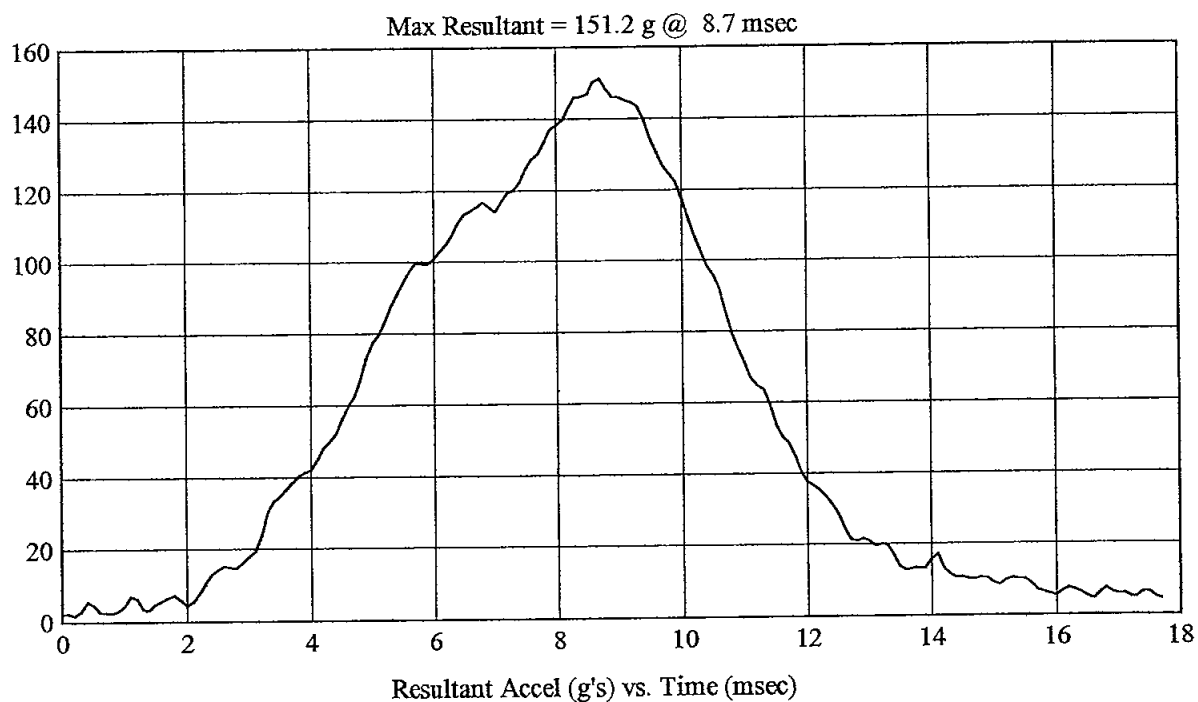
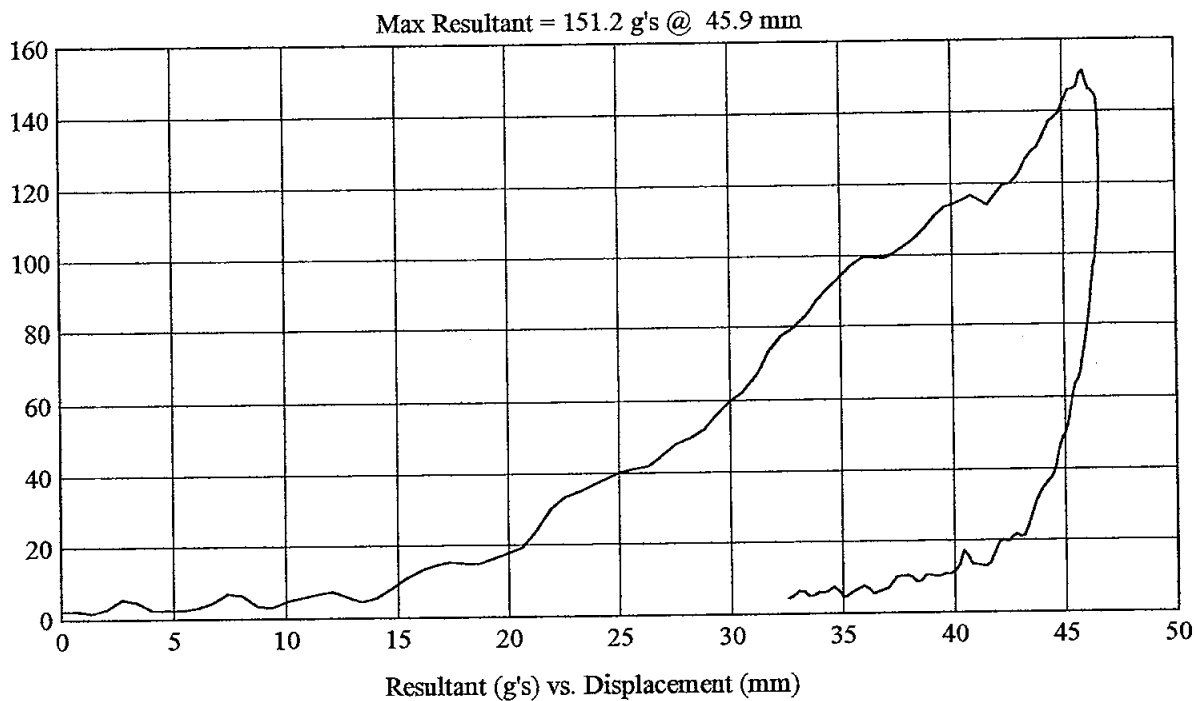
Customer: NHTSA
Test # 2
FM6166
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/19/06

Model Year: 2006
Target: SR1
Vehicle Side: Left
Horz/Vert Angle: 270/35

HIC(d) = 841, HIC = 894, Delta T = 6.2 msec



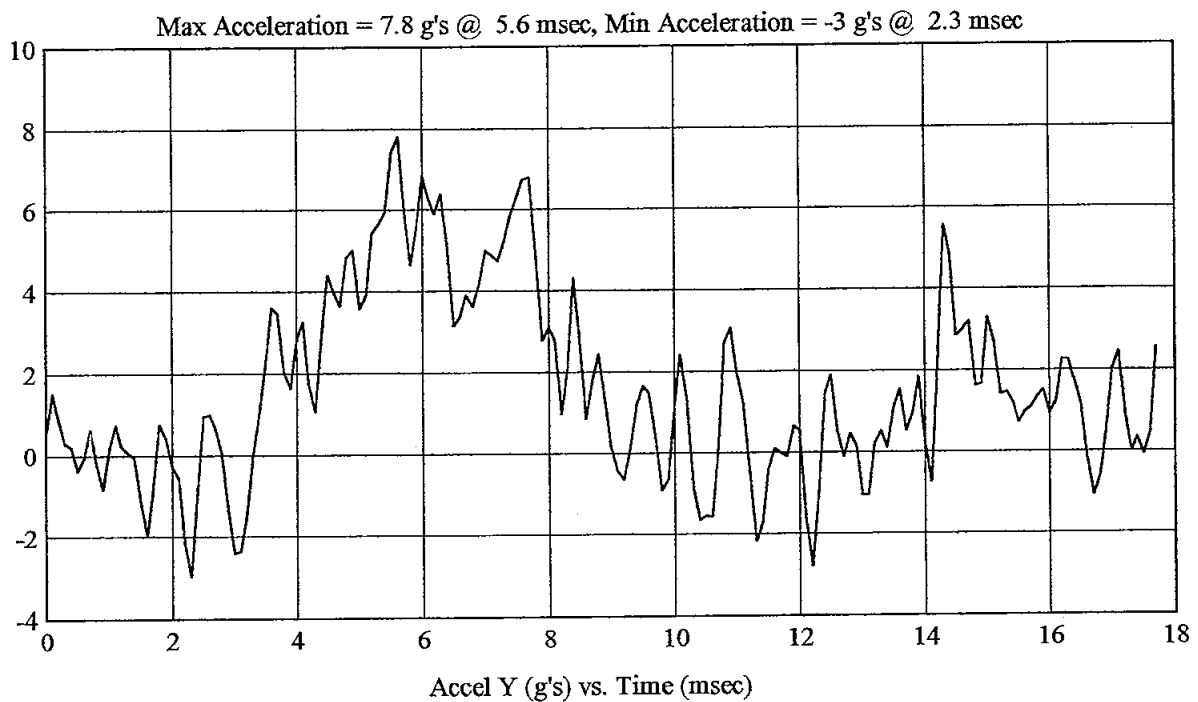
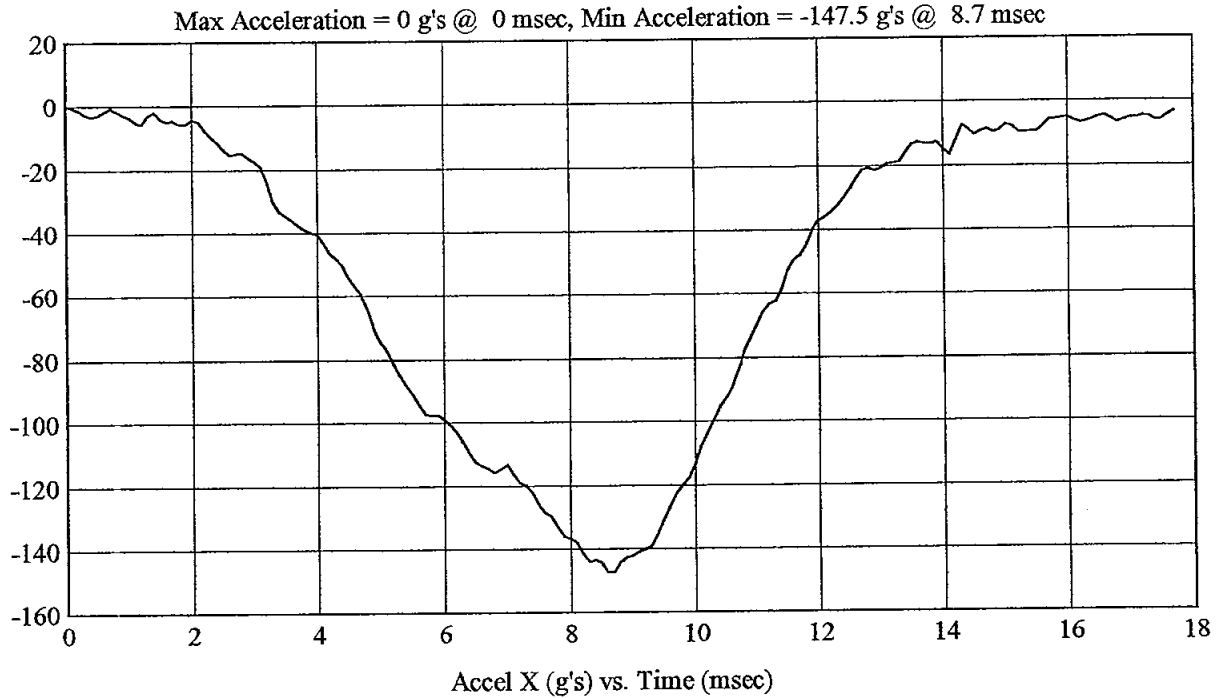
FMH
G06I7-001.4

Customer: NHTSA
Test # 2
FM6166
Additional Desc: N/A

Vehicle Program : Toyota
Test Date: 7/19/06

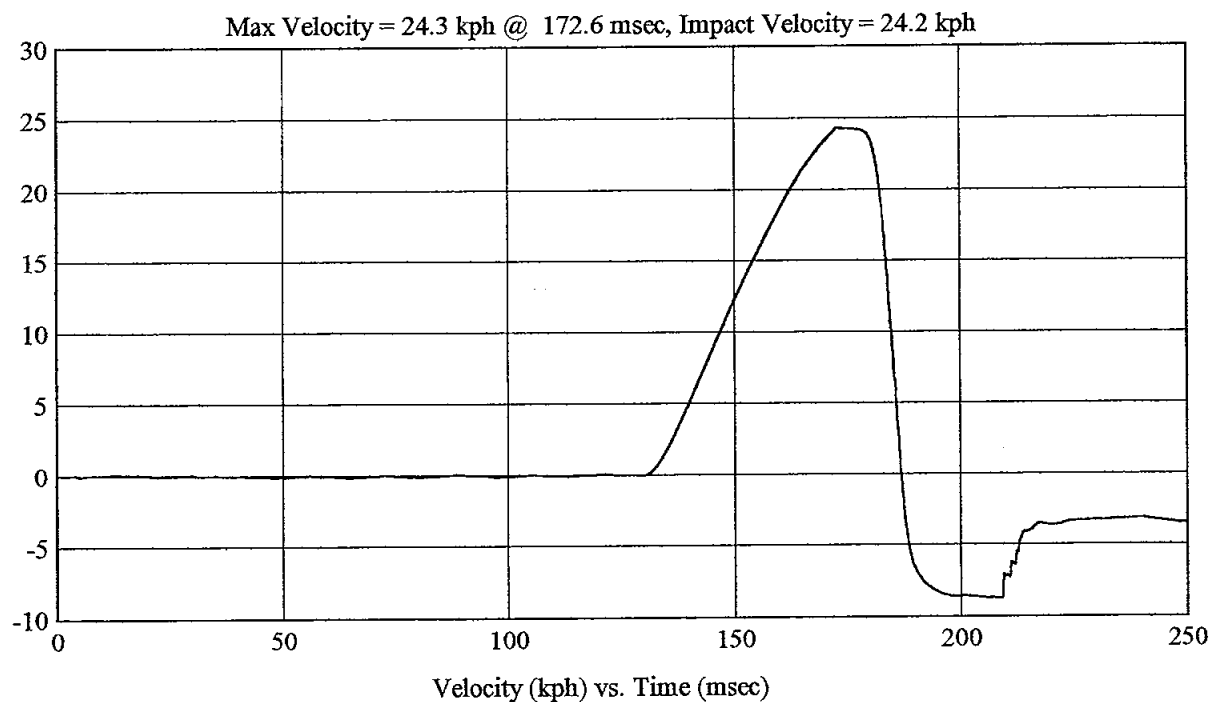
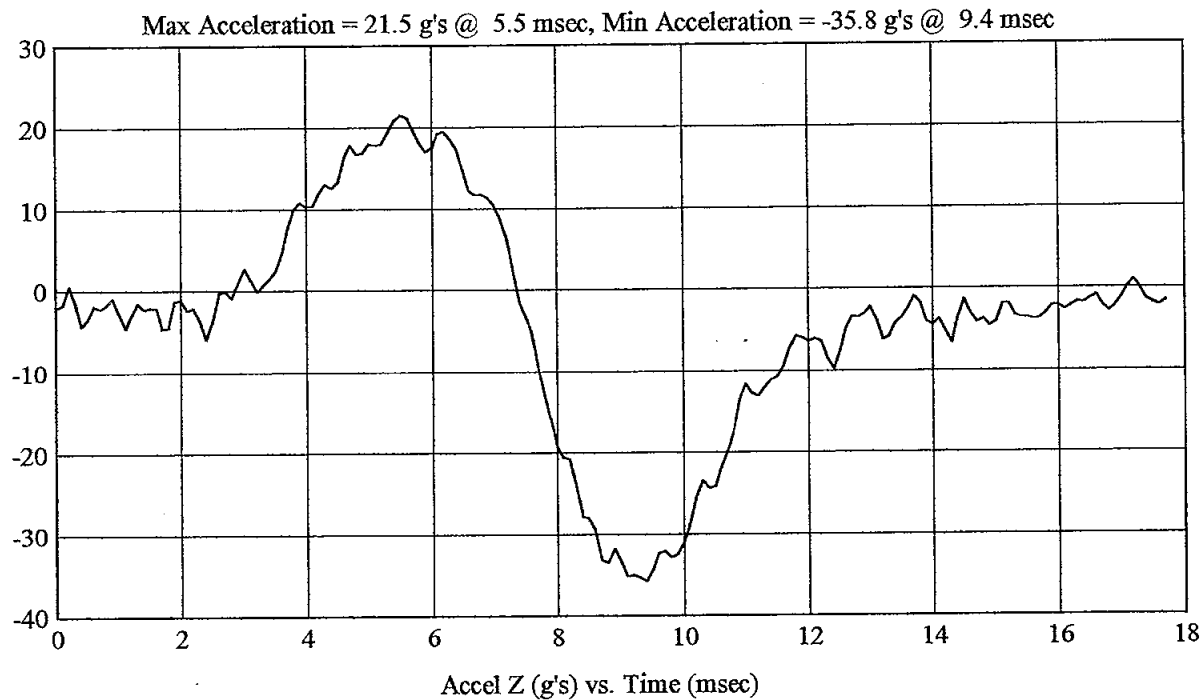
Model Year: 2006
Target: SR1
Vehicle Side: Left
Horz/Vert Angle: 270/35

HIC(d) = 841, HIC = 894, Delta T = 6.2 msec



FMH
G06I7-001.4Customer: NHTSA
Test # 2
FM6166
Additional Desc: N/AVehicle Program : Toyota
Test Date: 7/19/06Model Year: 2006
Target: SR1
Vehicle Side: Left
Horz/Vert Angle: 270/35

HIC(d) = 841, HIC = 894, Delta T = 6.2 msec



FMH
G06I7-001.4

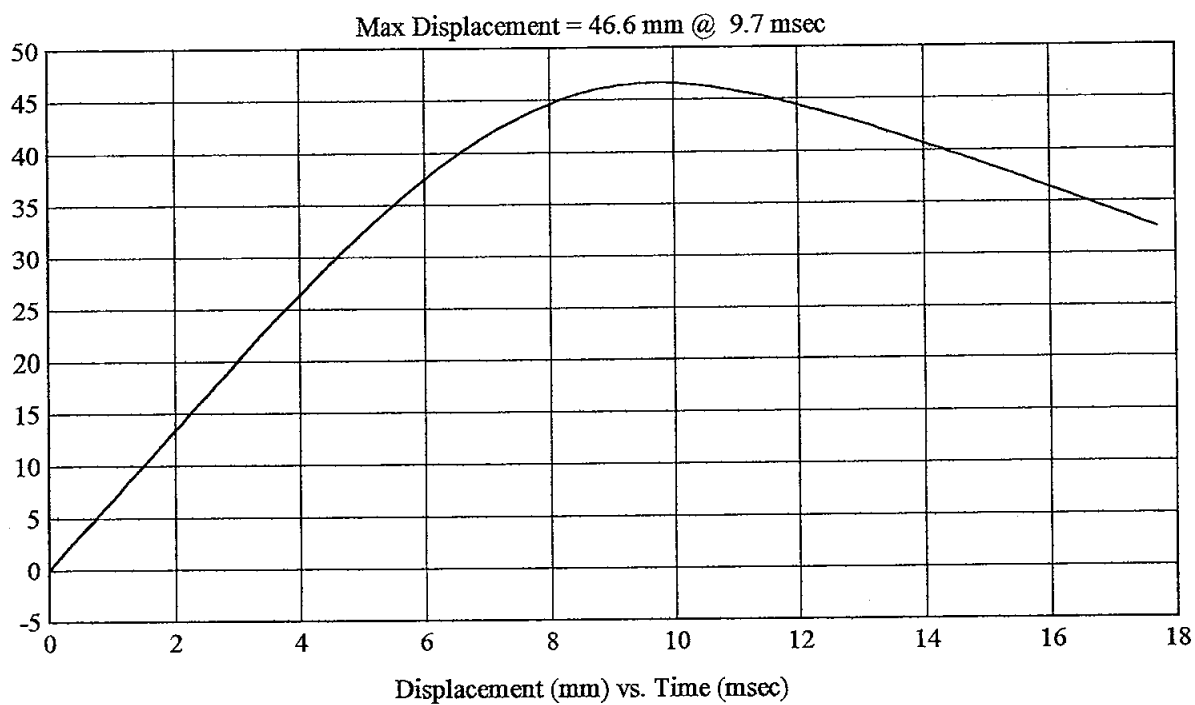
Customer: NHTSA
Test # 2
FM6166
Additional Desc: N/A

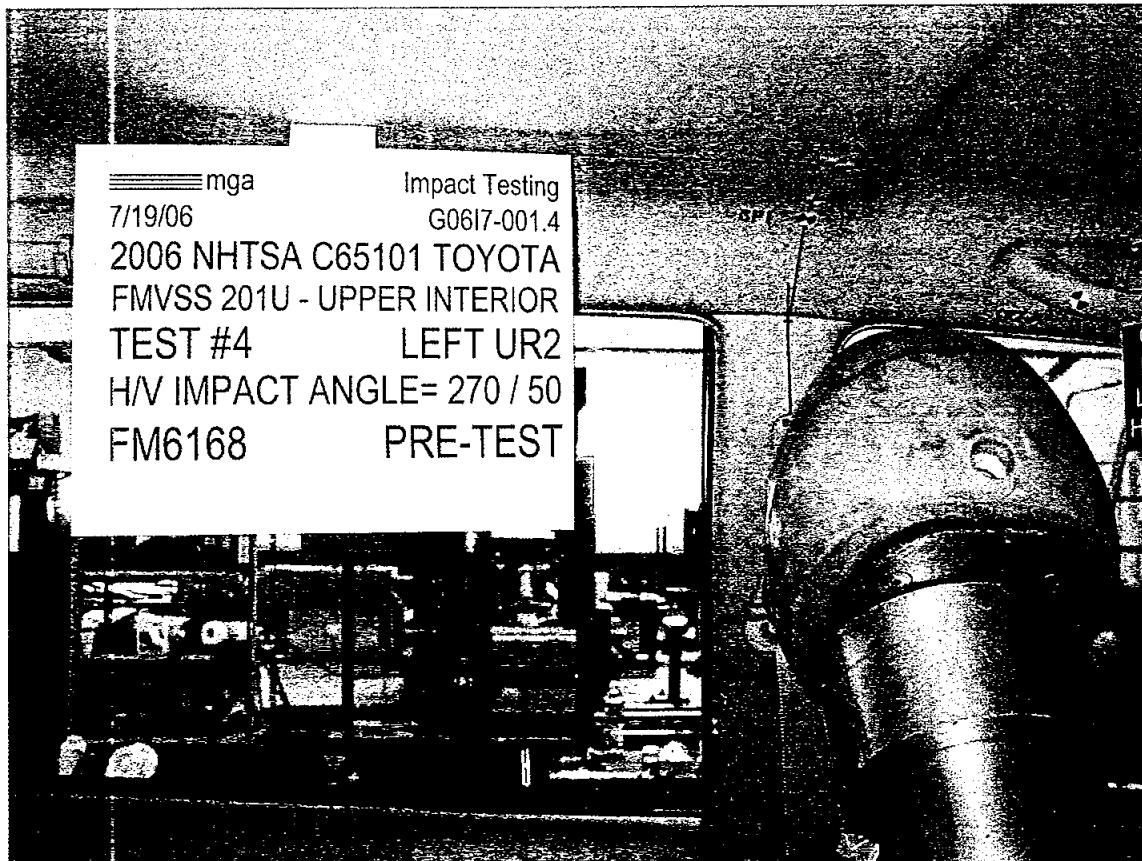
Vehicle Program : Toyota

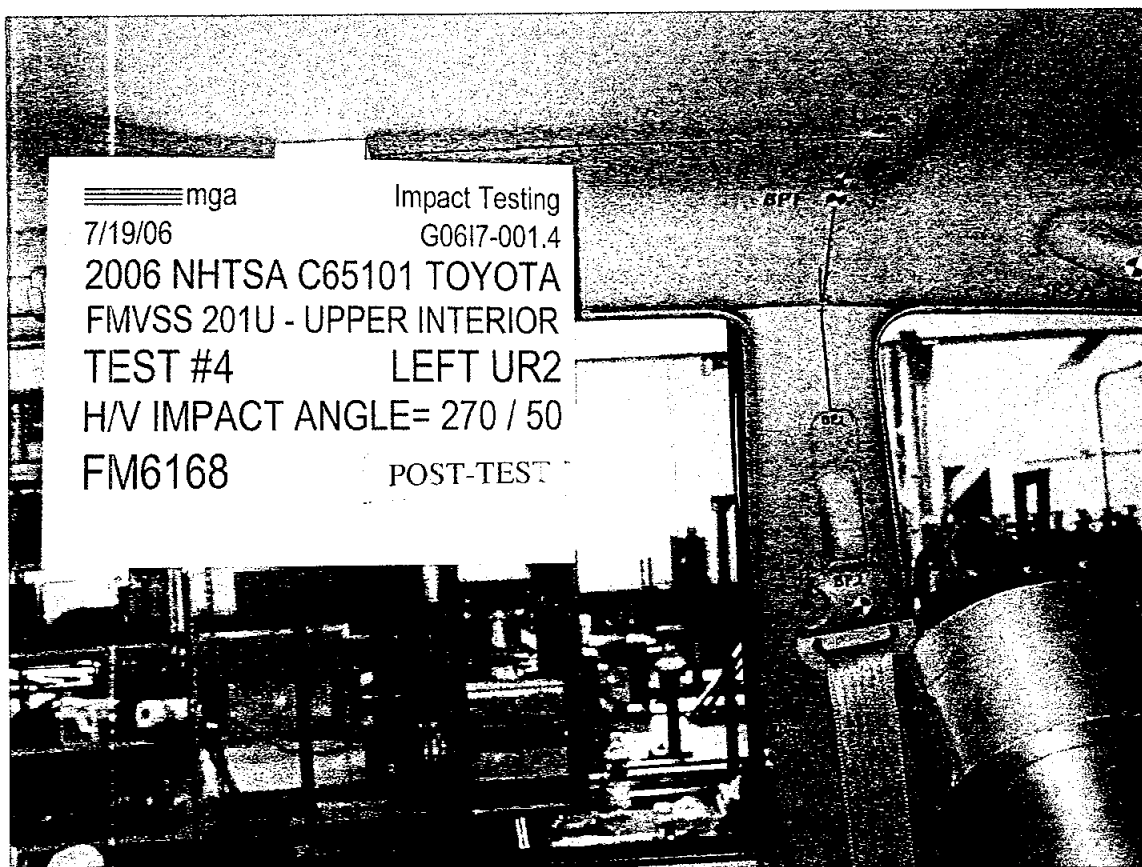
Test Date: 7/19/06

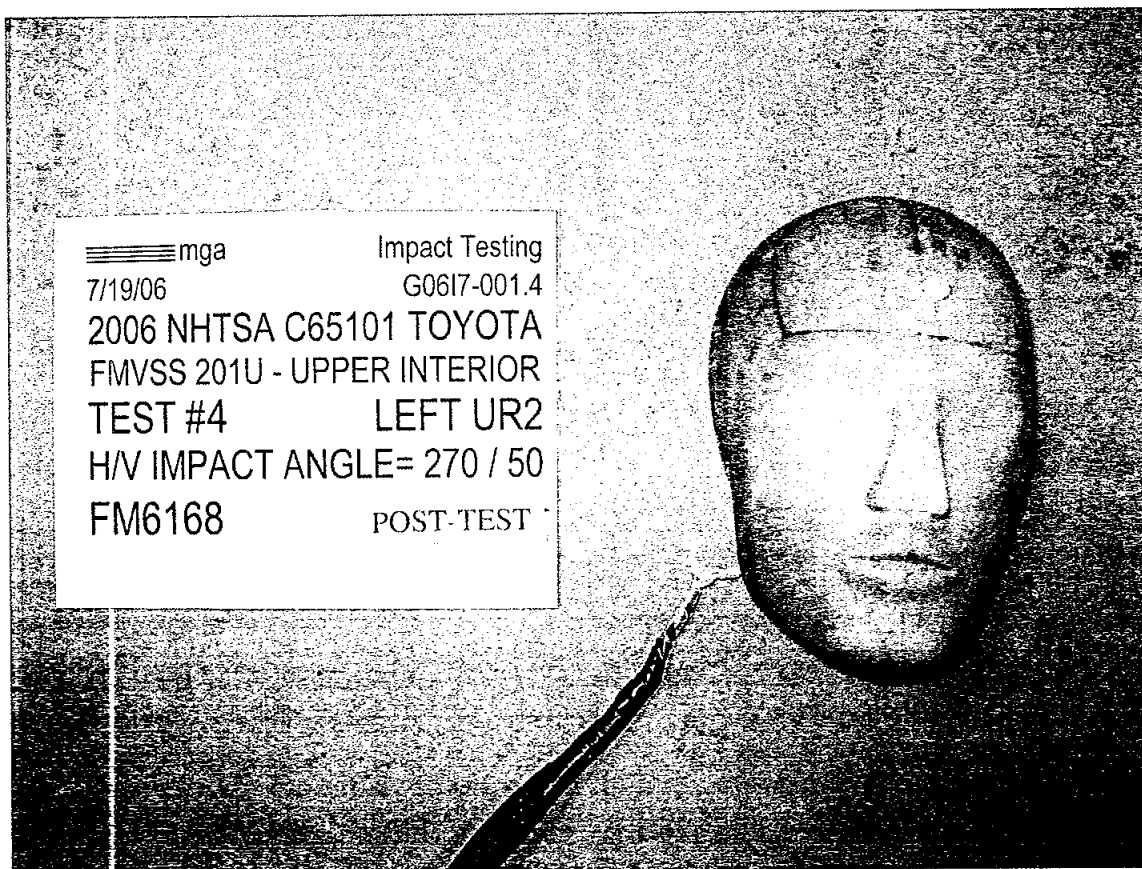
Model Year: 2006
Target: SR1
Vehicle Side: Left
Horz/Vert Angle: 270/35

HIC(d) = 841, HIC = 894, Delta T = 6.2 msec









SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0617-001.4

VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#4

Target (Vehicle Side): UR2 Left

Temperature:25C

MGA Test Reference No.:FM6168

Humidity:41%

Approach Horizontal Angles:270°

Time of Test:6:15 PM

Approach Vertical Angles:50°

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
653	646	8.4	23.3	22	6 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-91.4	1.55	1.54
Y	6	J35919	94.4	1.52	1.53
Z	7	J22664	94.3	1.45	1.45

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

No visible damage.

Recorded By: Matt Kerr Approved By*: Aileen A. Kalate Date: 7/19/06
 *Only necessary for NHTSA (Government) Compliance testing.

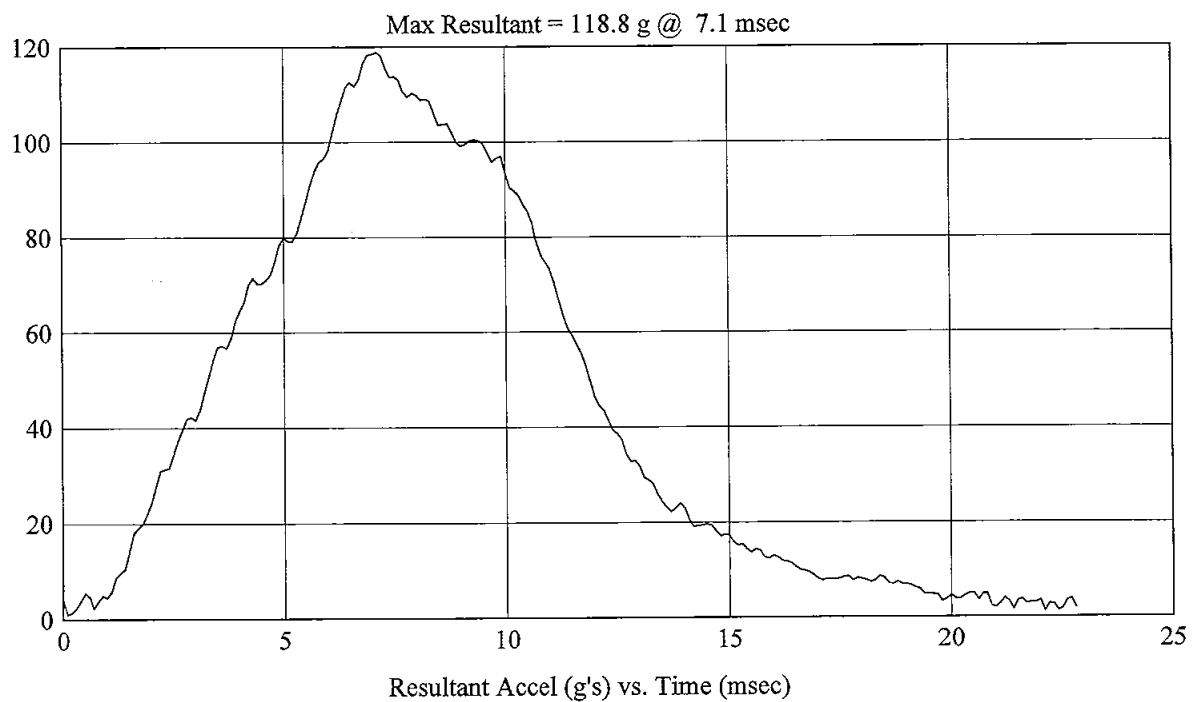
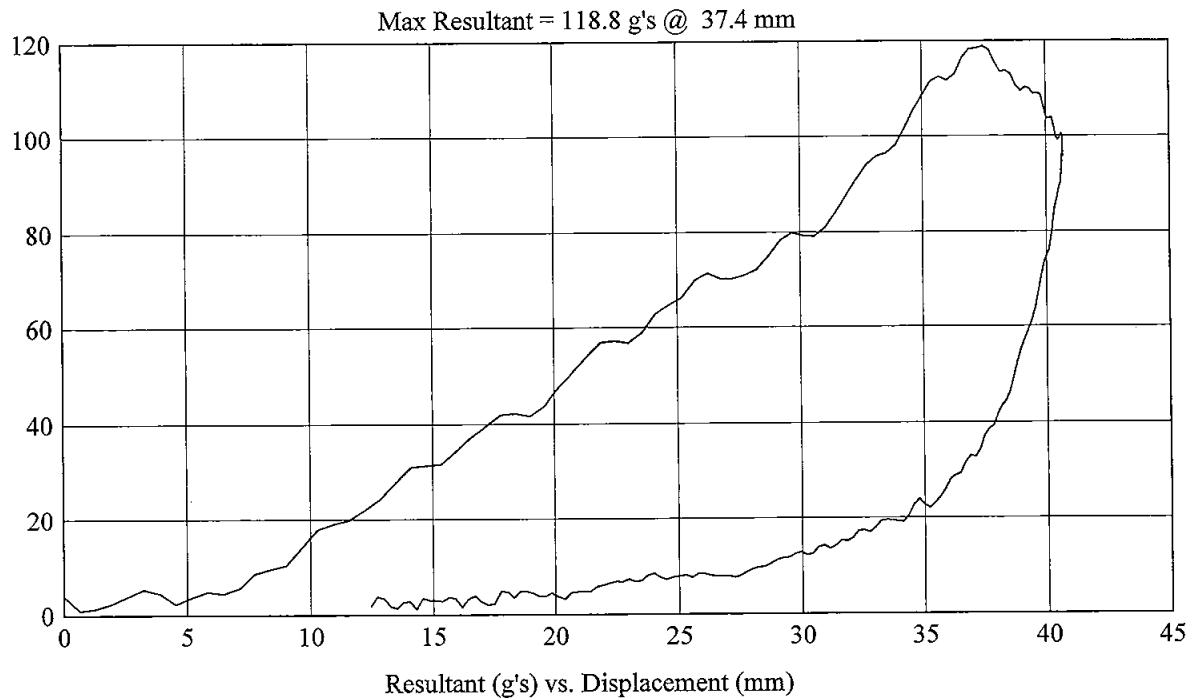
FMH
G06I7-001.4Customer: NHTSA
Test # 4
FM6168
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/19/06

Model Year: 2006
Target: UR2
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 653, HIC = 645, Delta T = 8.4 msec



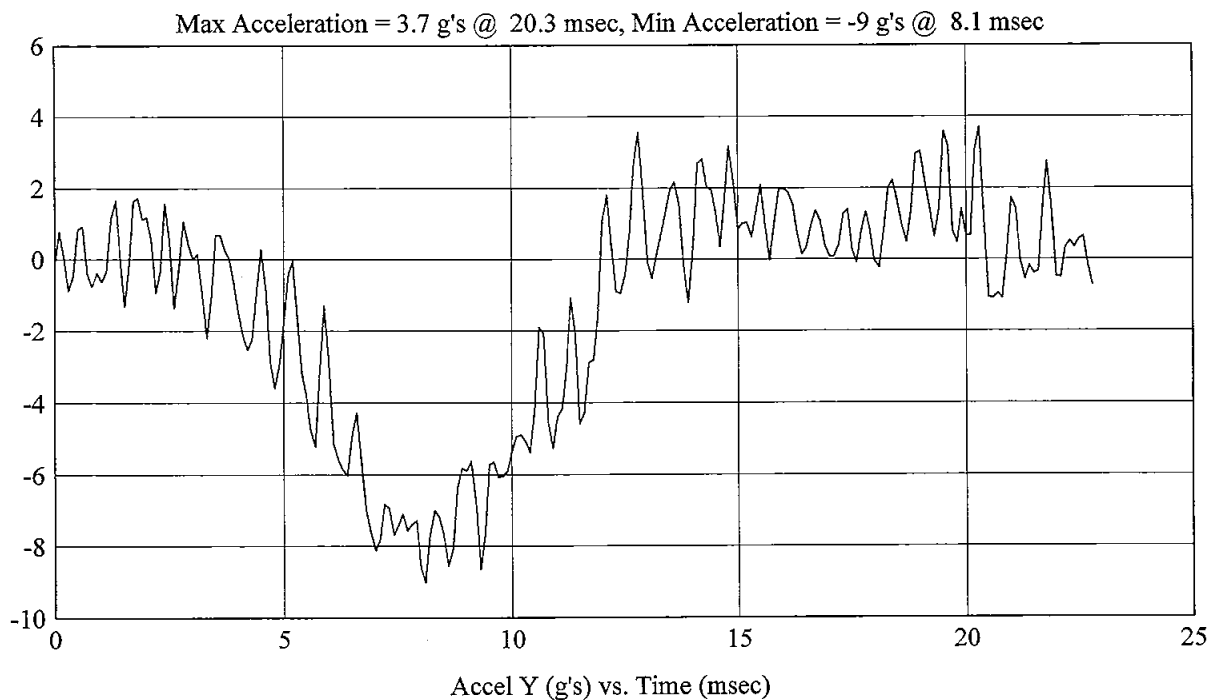
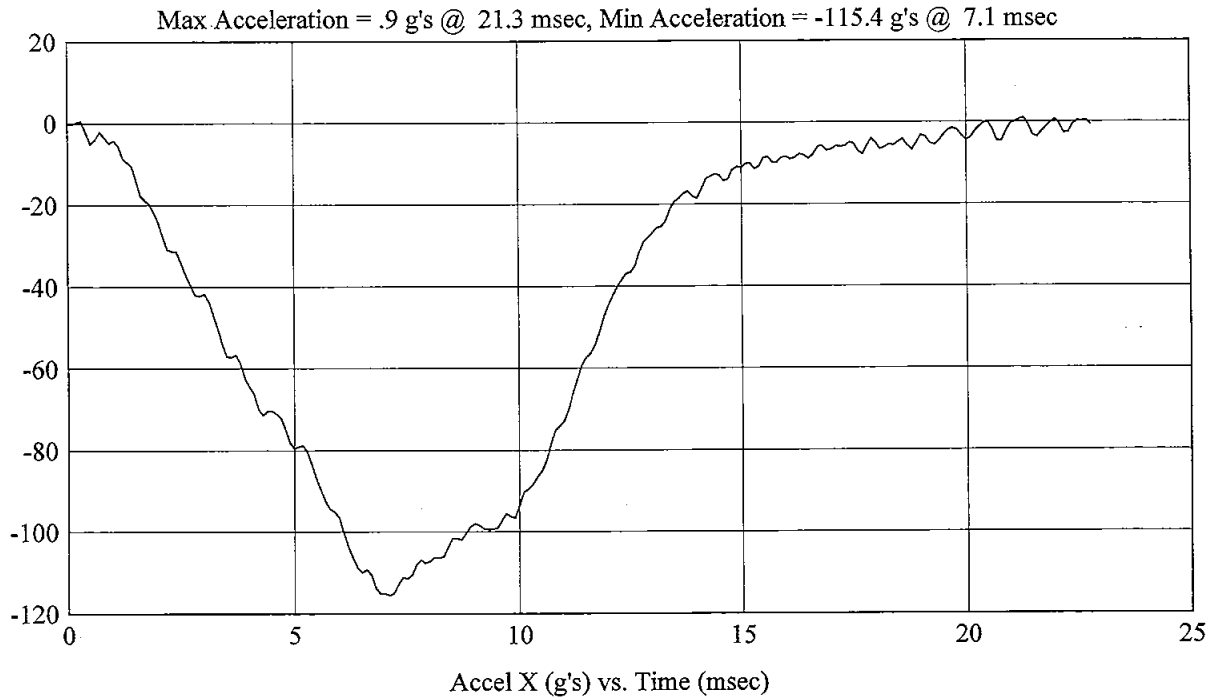
FMH
G06I7-001.4Customer: NHTSA
Test # 4
FM6168
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/19/06

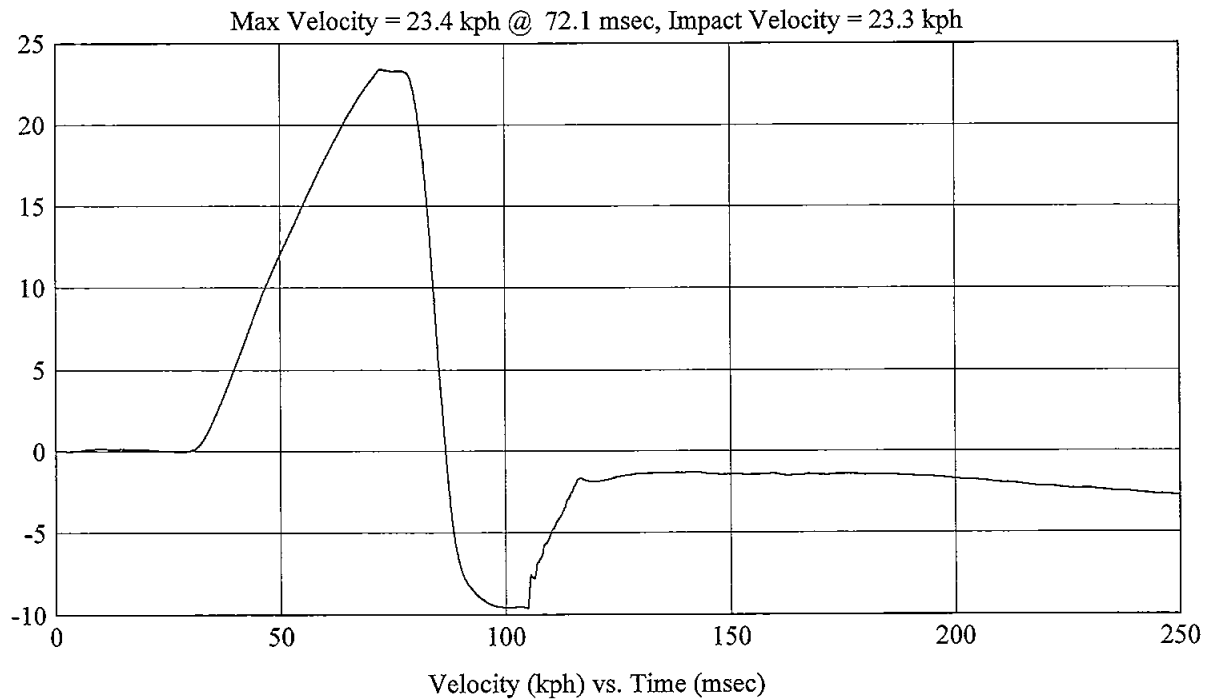
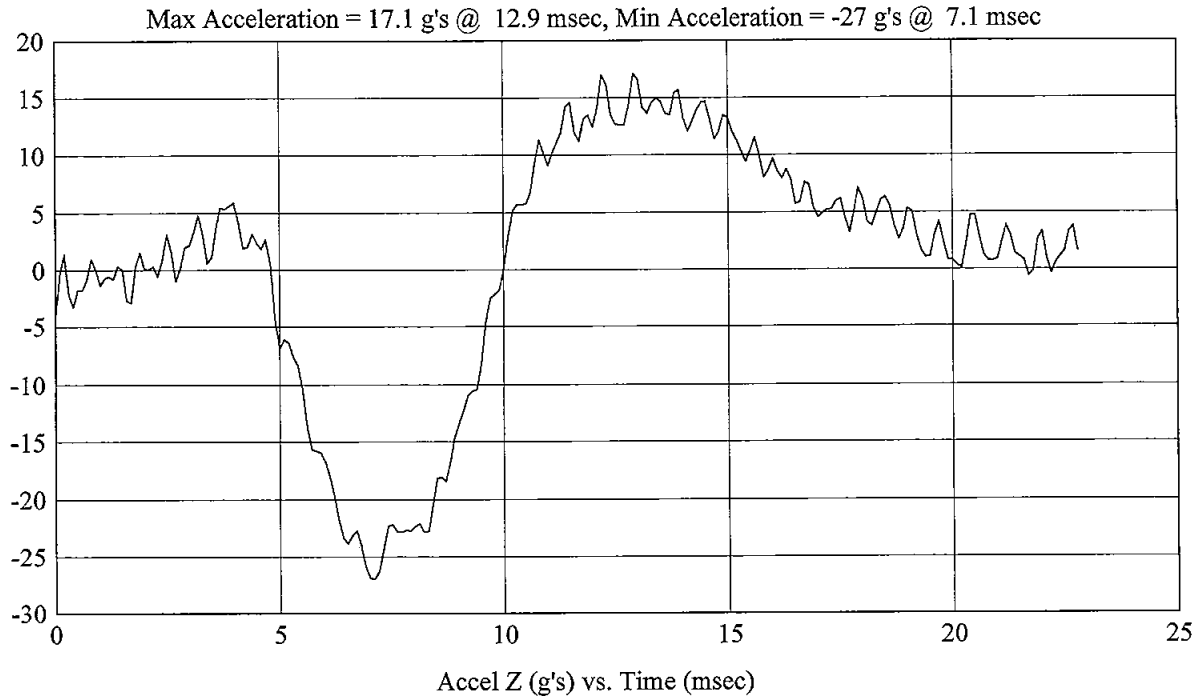
Model Year: 2006
Target: UR2
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 653, HIC = 645, Delta T = 8.4 msec



FMH
G06I7-001.4Customer: NHTSA
Test # 4
FM6168
Additional Desc: N/AVehicle Program : Toyota
Test Date: 7/19/06Model Year: 2006
Target: UR2
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 653, HIC = 645, Delta T = 8.4 msec



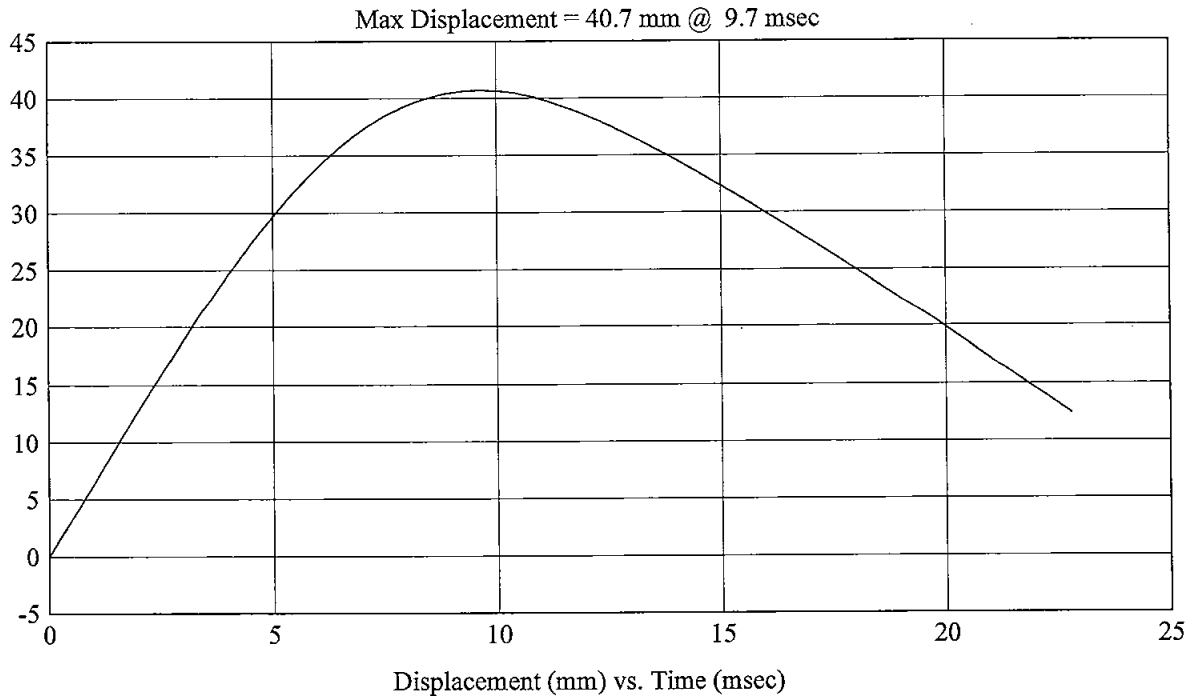
FMH
G06I7-001.4

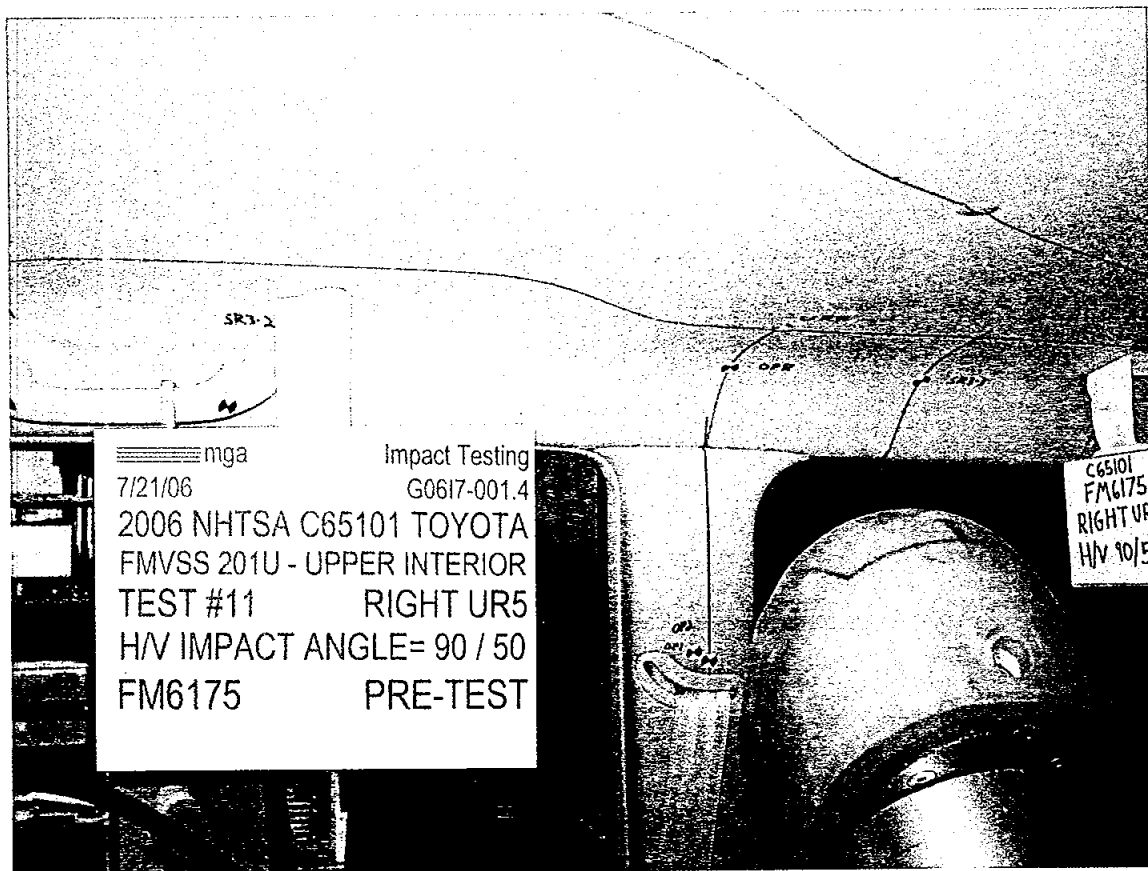
Customer: NHTSA
Test # 4
FM6168
Additional Desc: N/A

Vehicle Program : Toyota
Test Date: 7/19/06

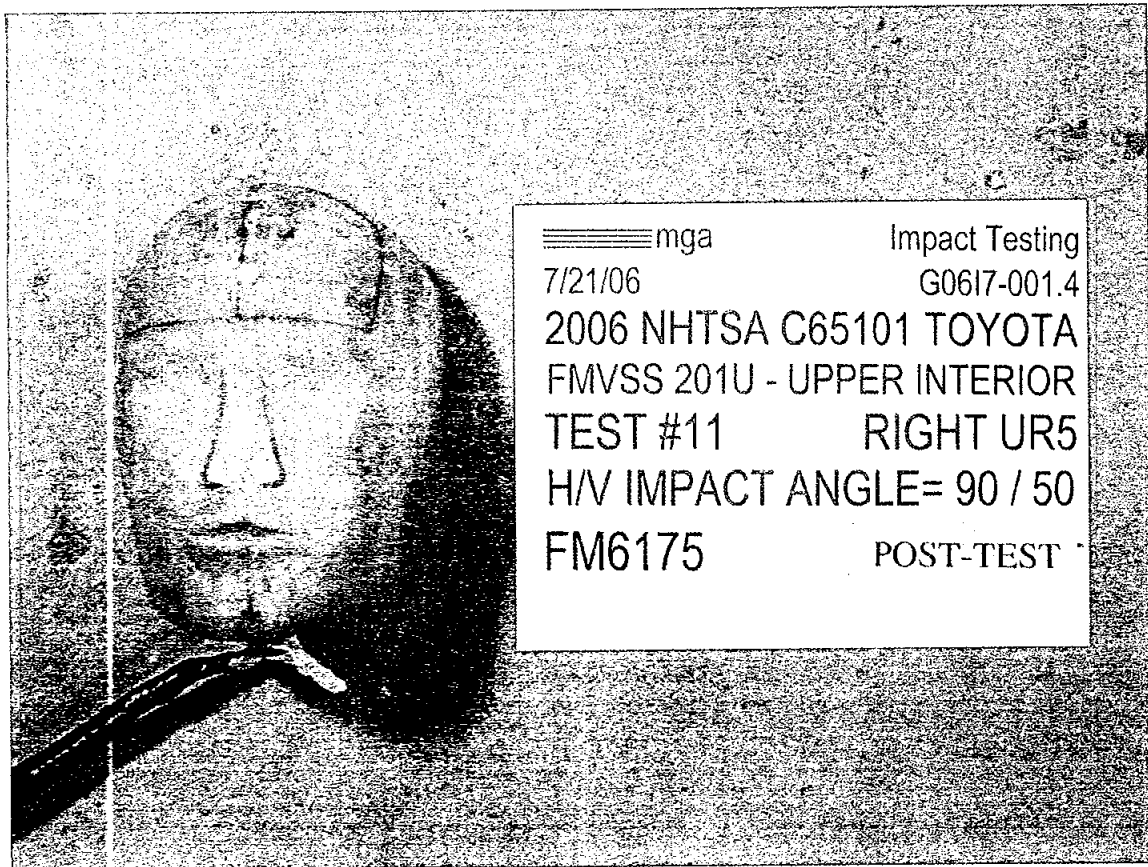
Model Year: 2006
Target: UR2
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 653, HIC = 645, Delta T = 8.4 msec









SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0617-001.4 VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#11

Target (Vehicle Side): UR5 Right

Temperature:24C

MGA Test Reference No.:FM6175

Humidity:39%

Approach Horizontal Angles:90°

Time of Test:9:30 AM

Approach Vertical Angles:50°

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
438	360	8.6	23.8	22	3 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-91.4	1.54	1.54
Y	6	J35919	94.4	1.53	1.53
Z	7	J22664	94.3	1.45	1.45

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

Headliner deformation.

Recorded By: Matt Kerr Approved By*: Heena A. Kalita Date: 7/21/06
 *Only necessary for NHTSA (Government) Compliance testing.

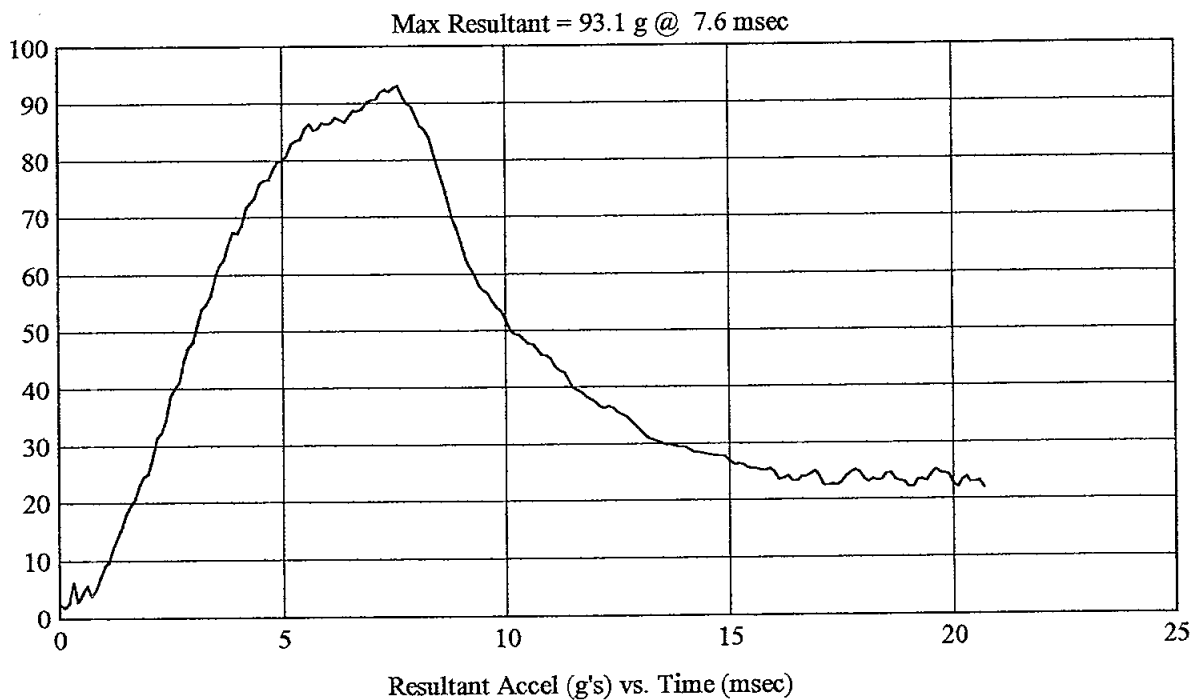
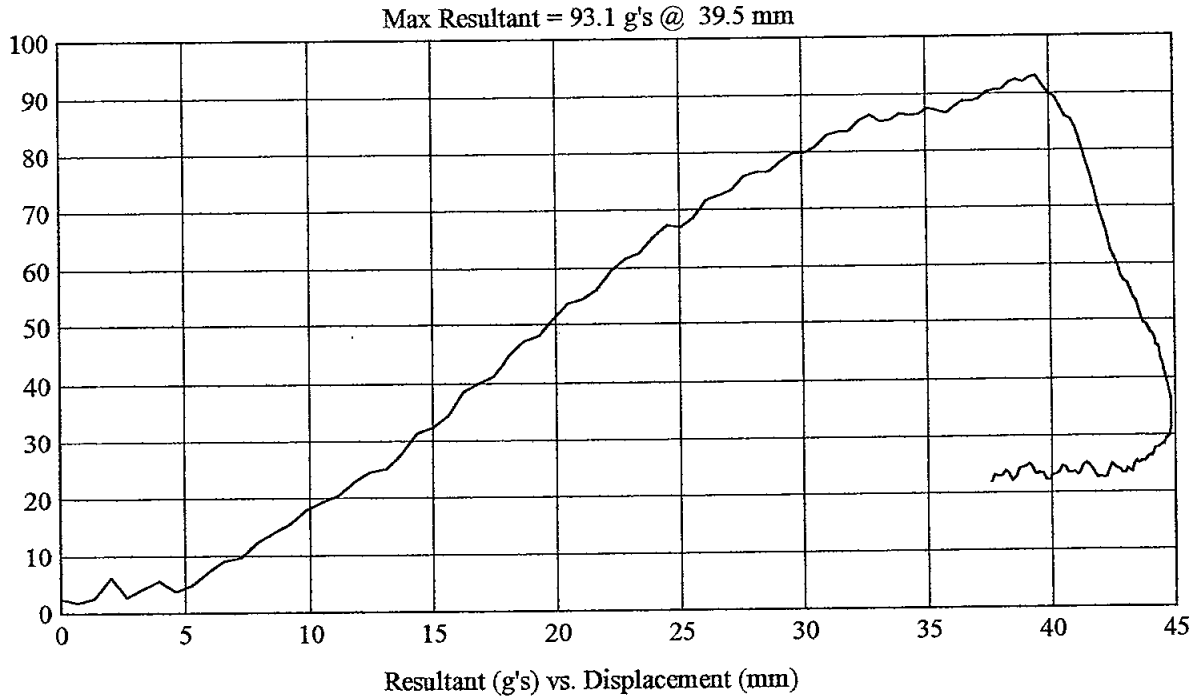
FMH
G06I7-001.4

Customer: NHTSA
Test # 11
FM6175
Additional Desc: N/A

Vehicle Program : Toyota
Test Date: 7/21/06

Model Year: 2006
Target: UR5
Vehicle Side: Right
Horz/Vert Angle: 90/50

HIC(d) = 438, HIC = 360, Delta T = 8.6 msec



FMH
G06I7-001.4

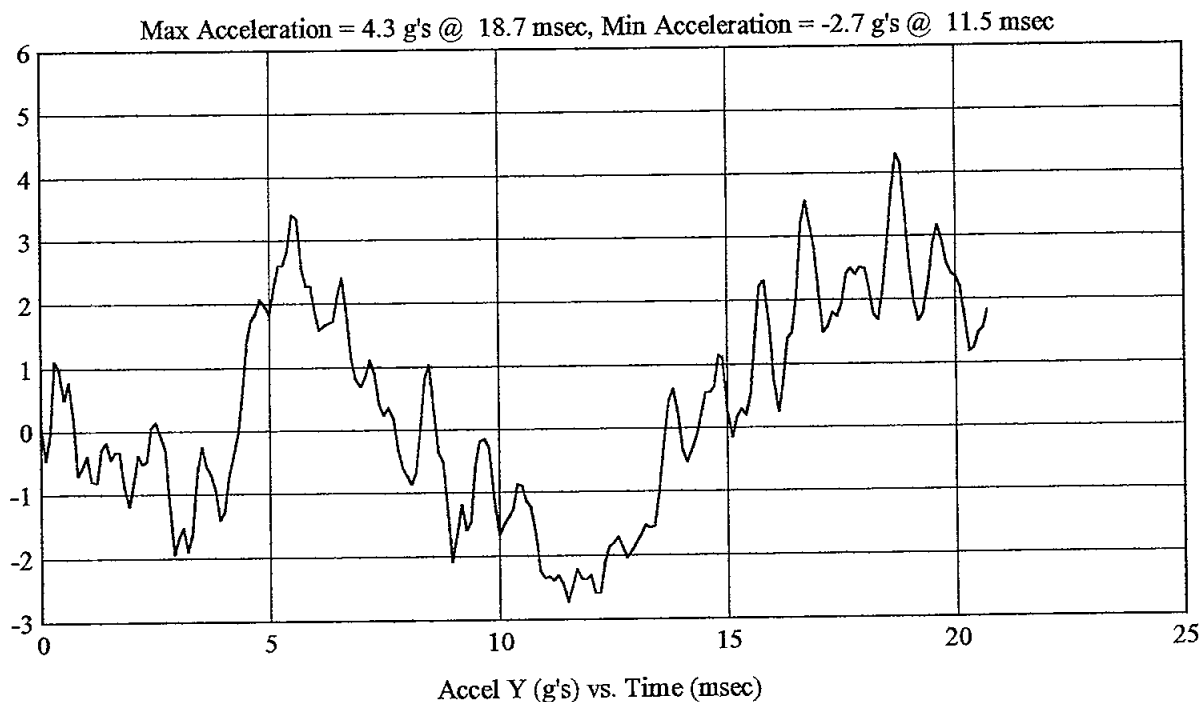
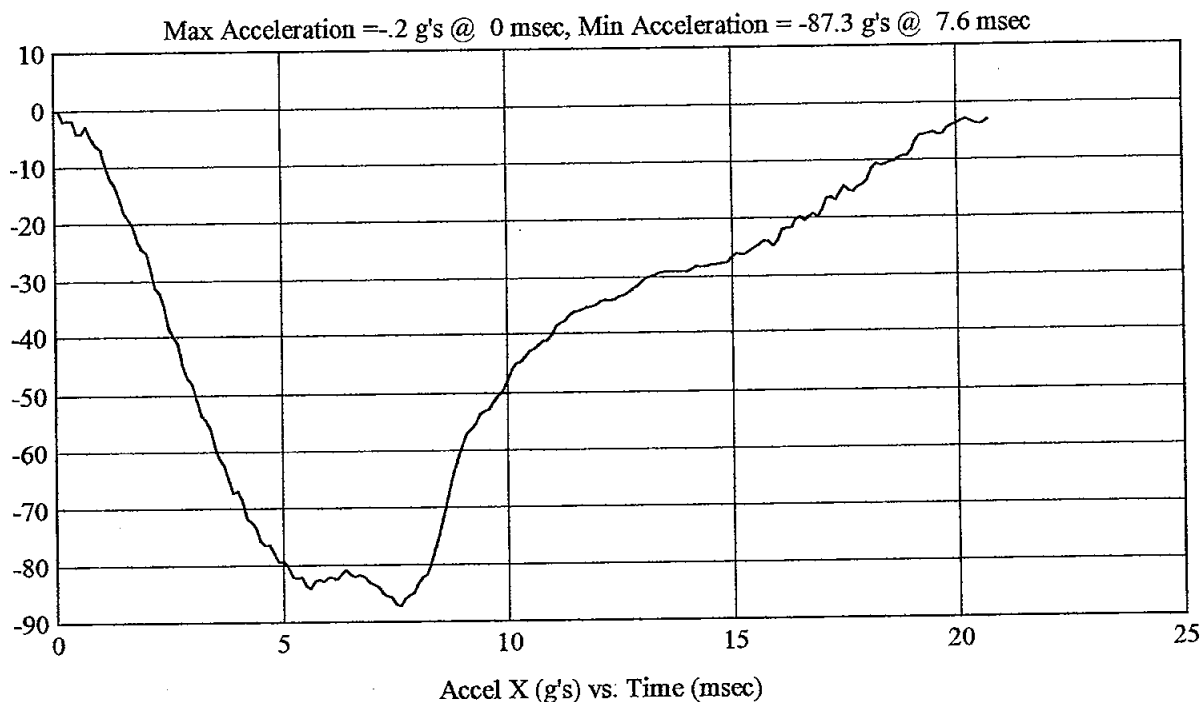
Customer: NHTSA
Test # 11
FM6175
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/21/06

Model Year: 2006
Target: UR5
Vehicle Side: Right
Horz/Vert Angle: 90/50

HIC(d) = 438, HIC = 360, Delta T = 8.6 msec



FMH
G06I7-001.4

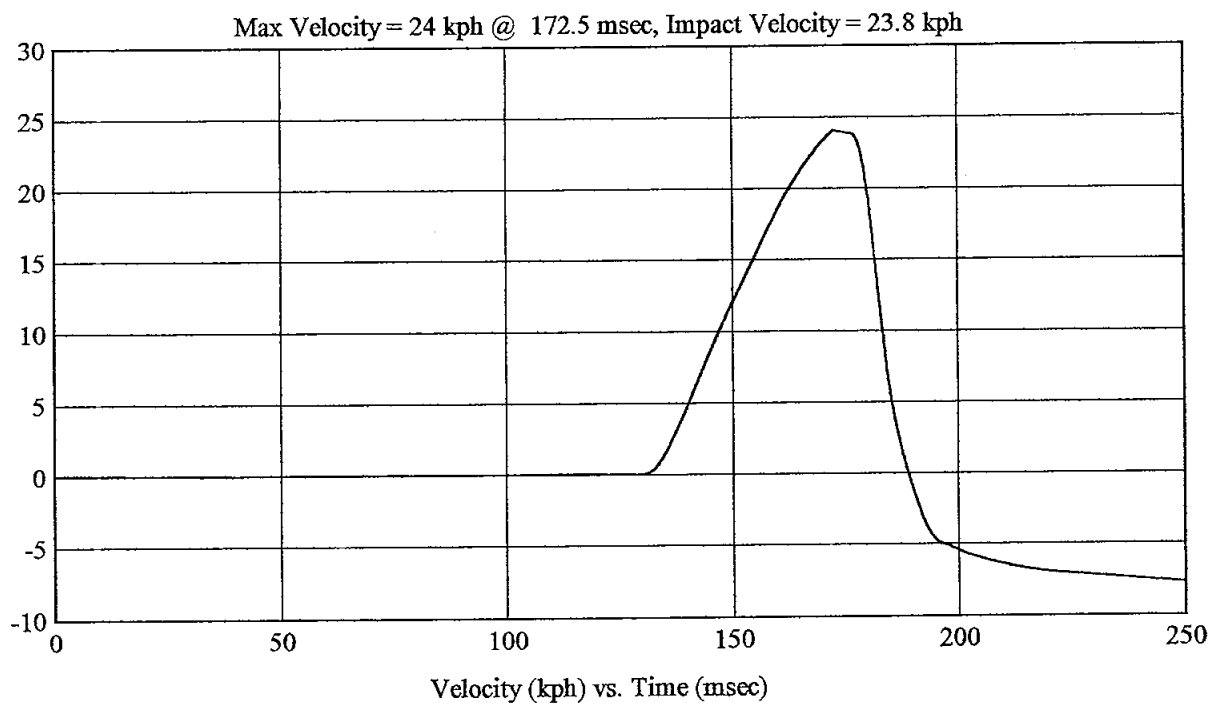
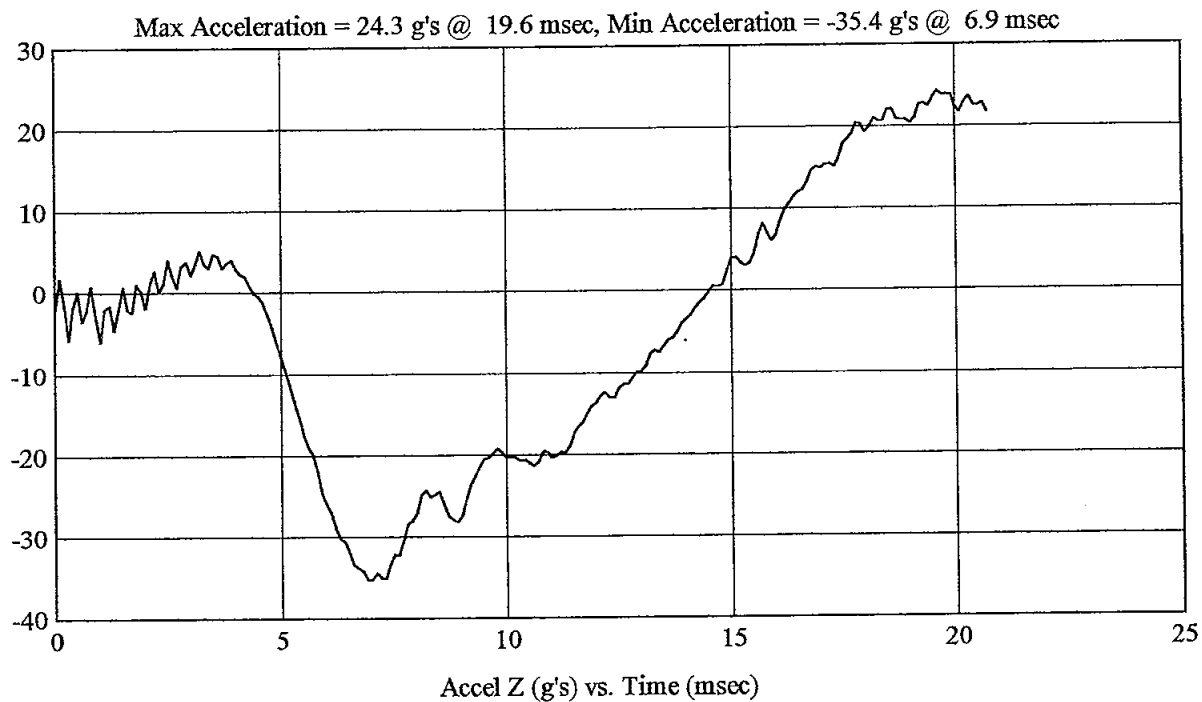
Customer: NHTSA
Test # 11
FM6175
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/21/06

Model Year: 2006
Target: UR5
Vehicle Side: Right
Horz/Vert Angle: 90/50

HIC(d) = 438, HIC = 360, Delta T = 8.6 msec



FMH
G06I7-001.4

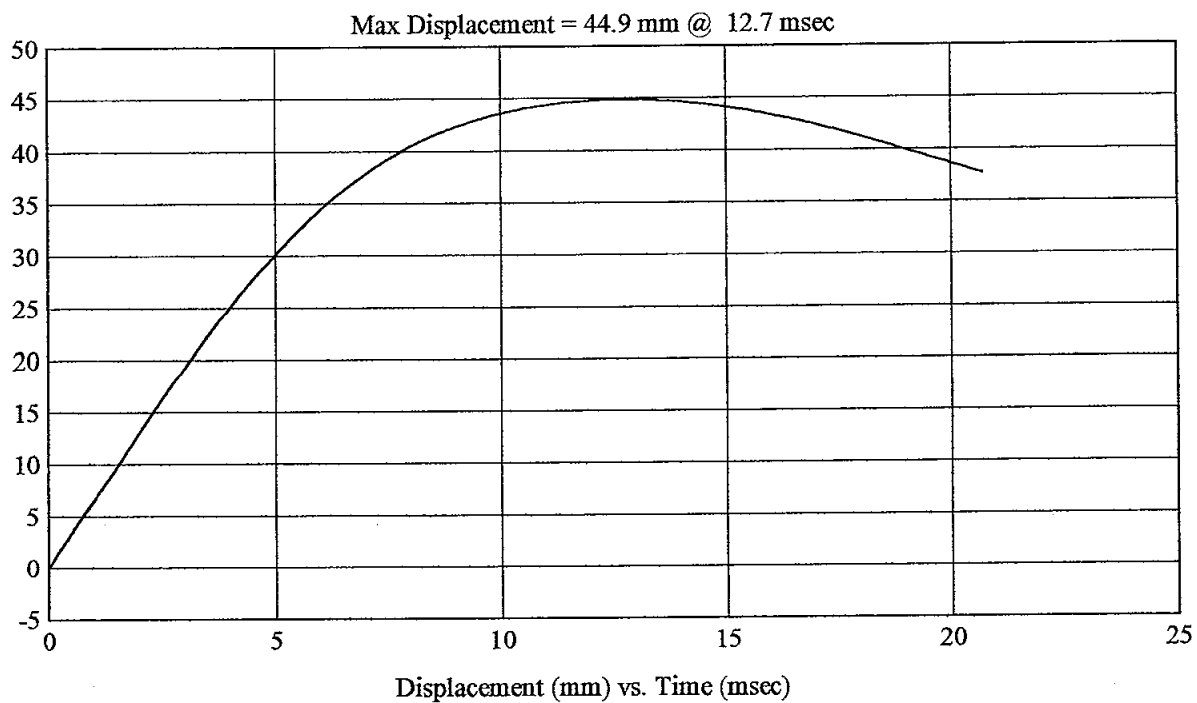
Customer: NHTSA
Test # 11
FM6175
Additional Desc: N/A

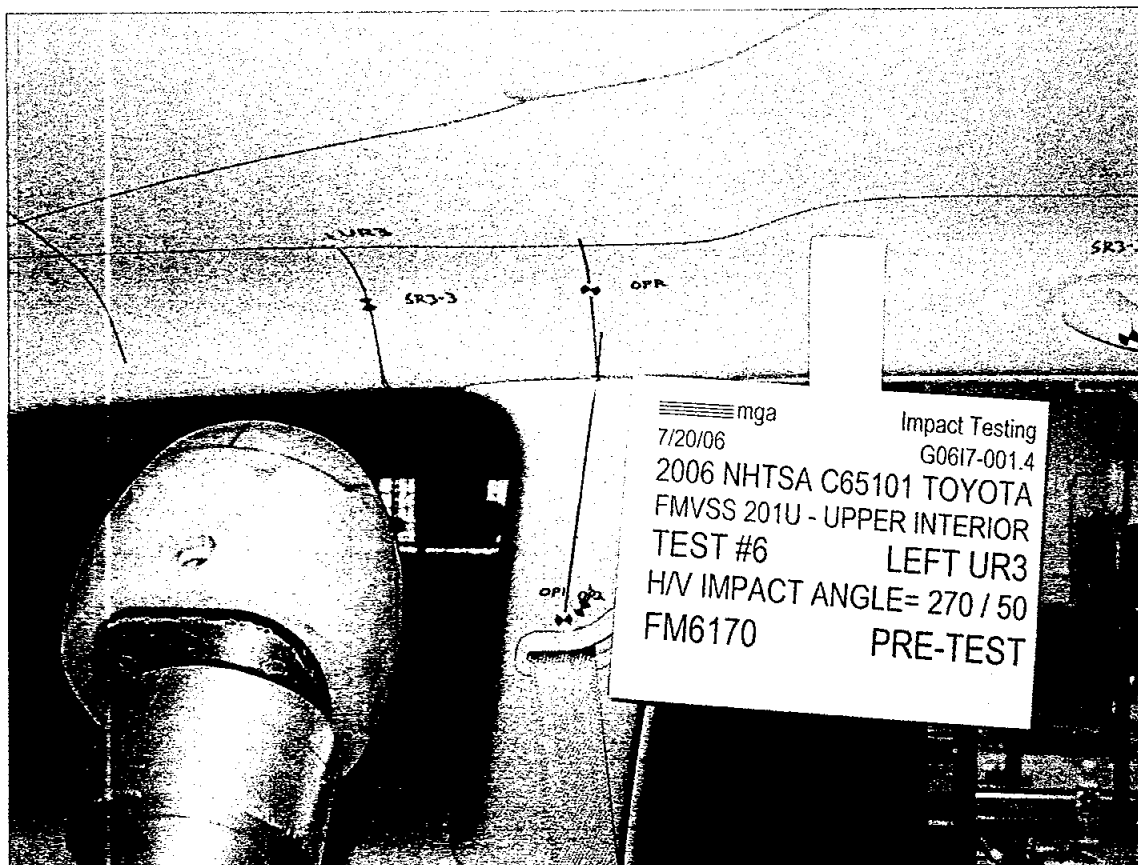
Vehicle Program : Toyota

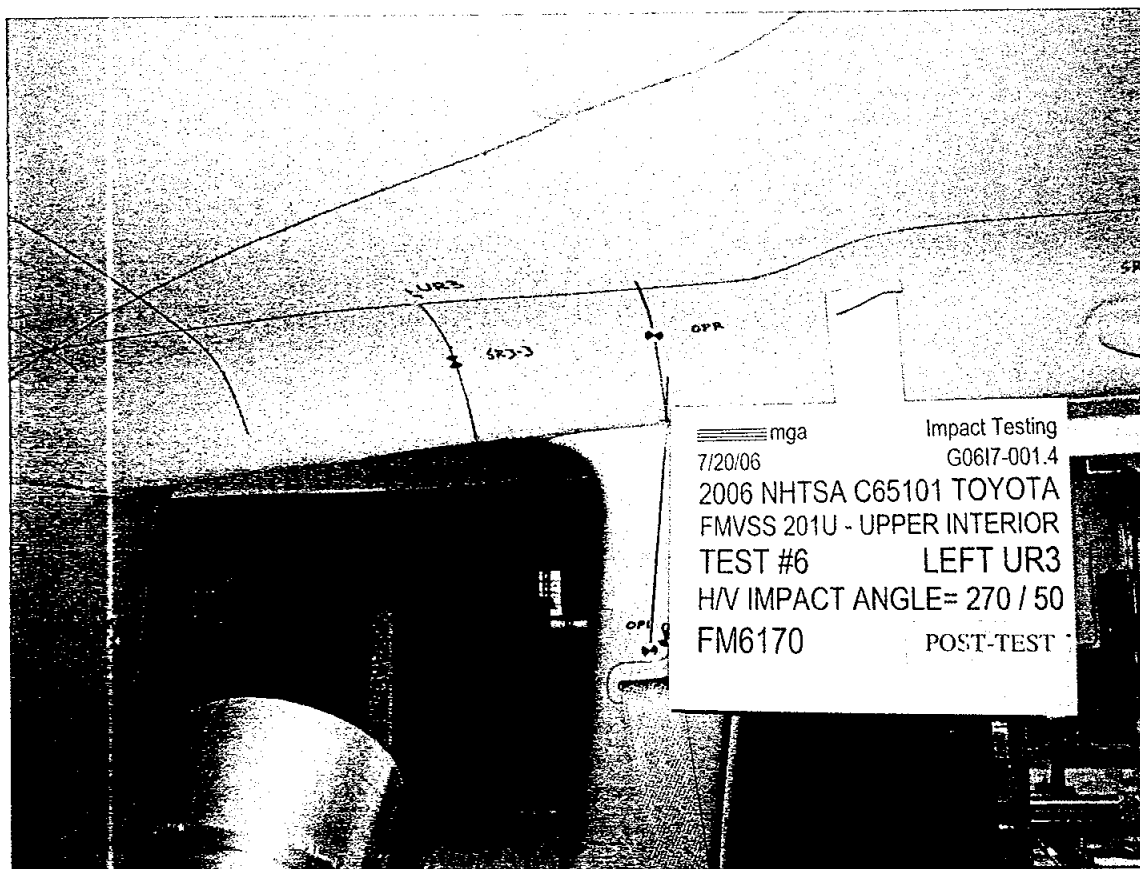
Test Date: 7/21/06

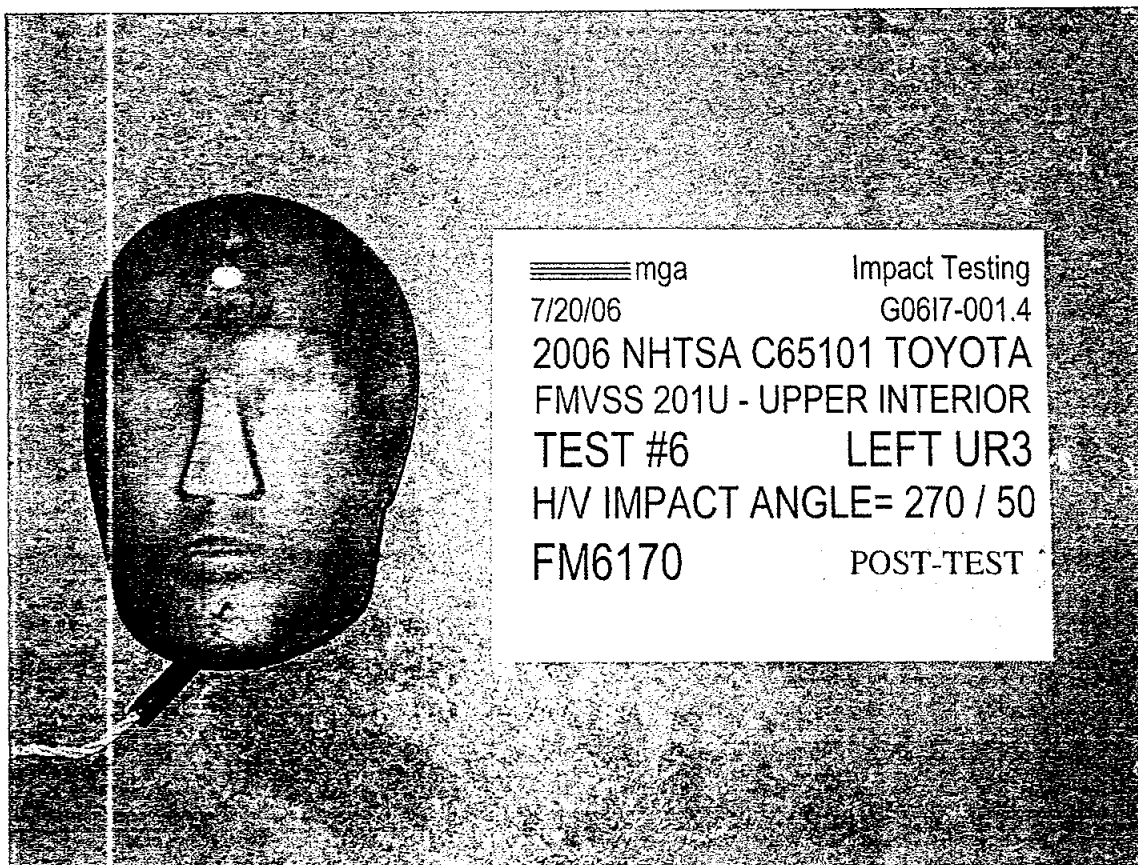
Model Year: 2006
Target: UR5
Vehicle Side: Right
Horz/Vert Angle: 90/50

HIC(d) = 438, HIC = 360, Delta T = 8.6 msec









SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.4

VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#6

Target (Vehicle Side): UR3 Left

Temperature:24C

MGA Test Reference No.:FM6170

Humidity:45%

Approach Horizontal Angles:270°

Time of Test: 10:00 AM

Approach Vertical Angles:50°

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
630	614	8	24.0	23	3 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108.8	1.55	1.55
Y	6	J36193	102.7	1.53	1.53
Z	7	J36353	97.2	1.45	1.45

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

Headliner creased.

By: Matt KerrApproved By*: Heena Q. KalitaDate: 7/20/06

*Only necessary for NHTSA (Government) Compliance testing.

FMH
G06I7-001.4

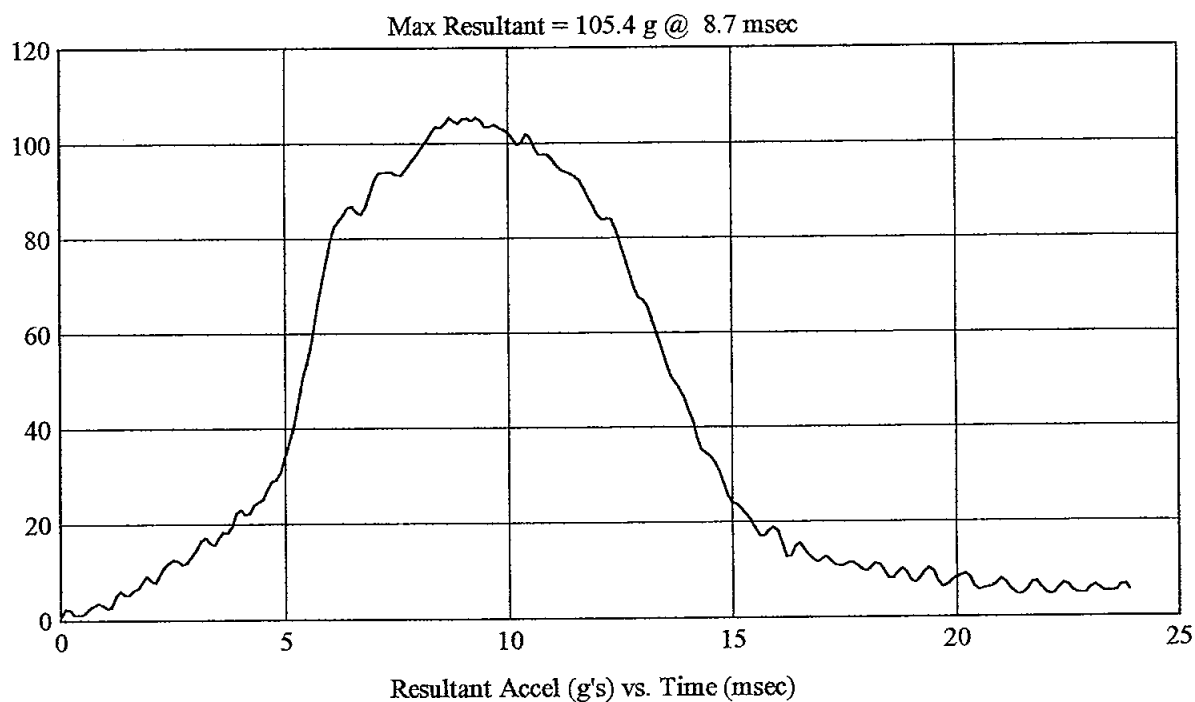
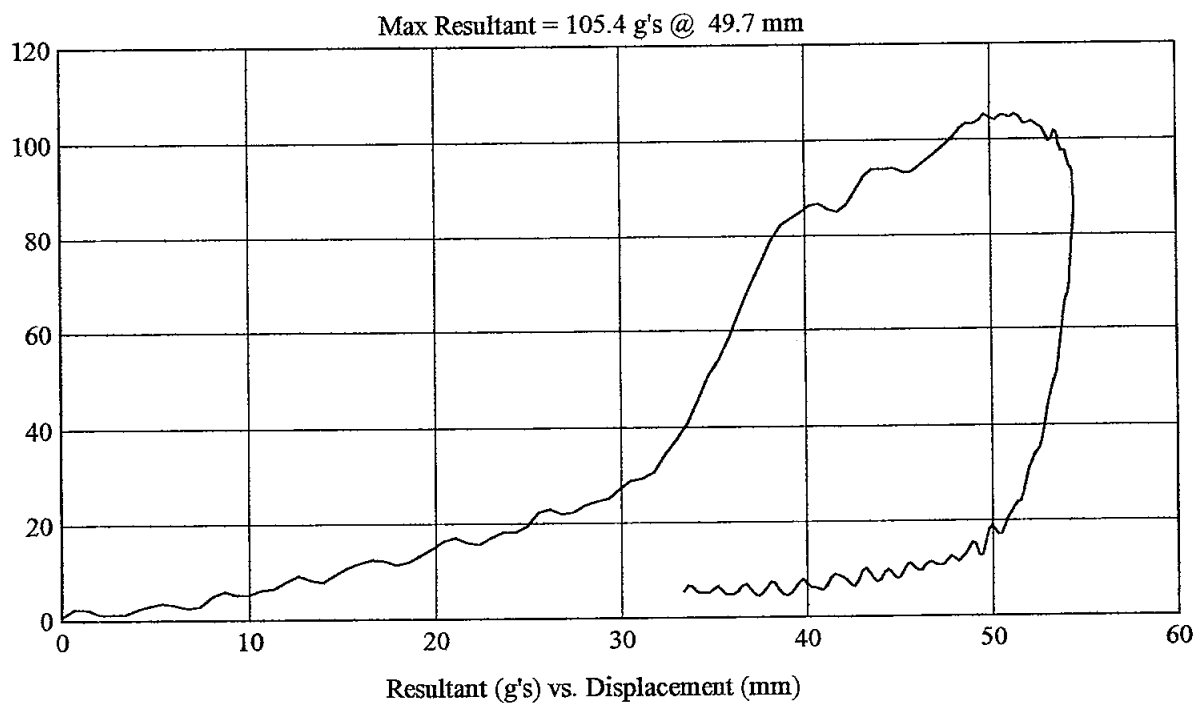
Customer: NHTSA
Test # 6
FM6170
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: UR3
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 630, HIC = 614, Delta T = 8 msec



FMH
G0617-001.4

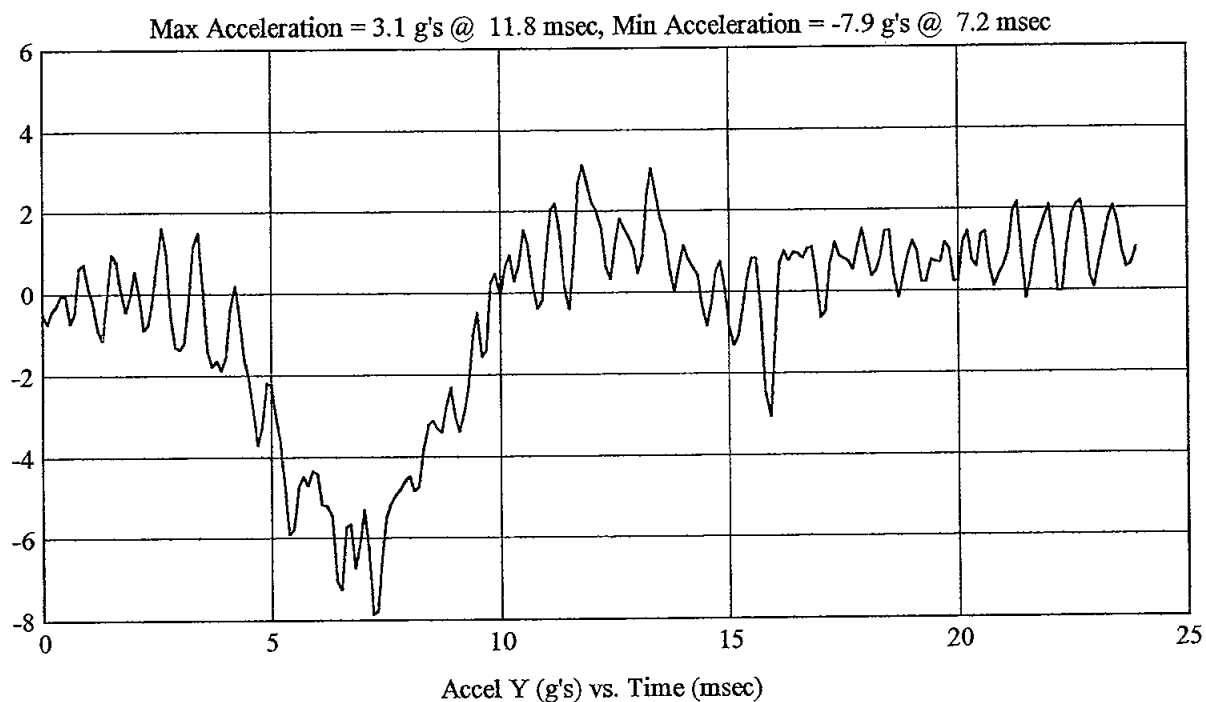
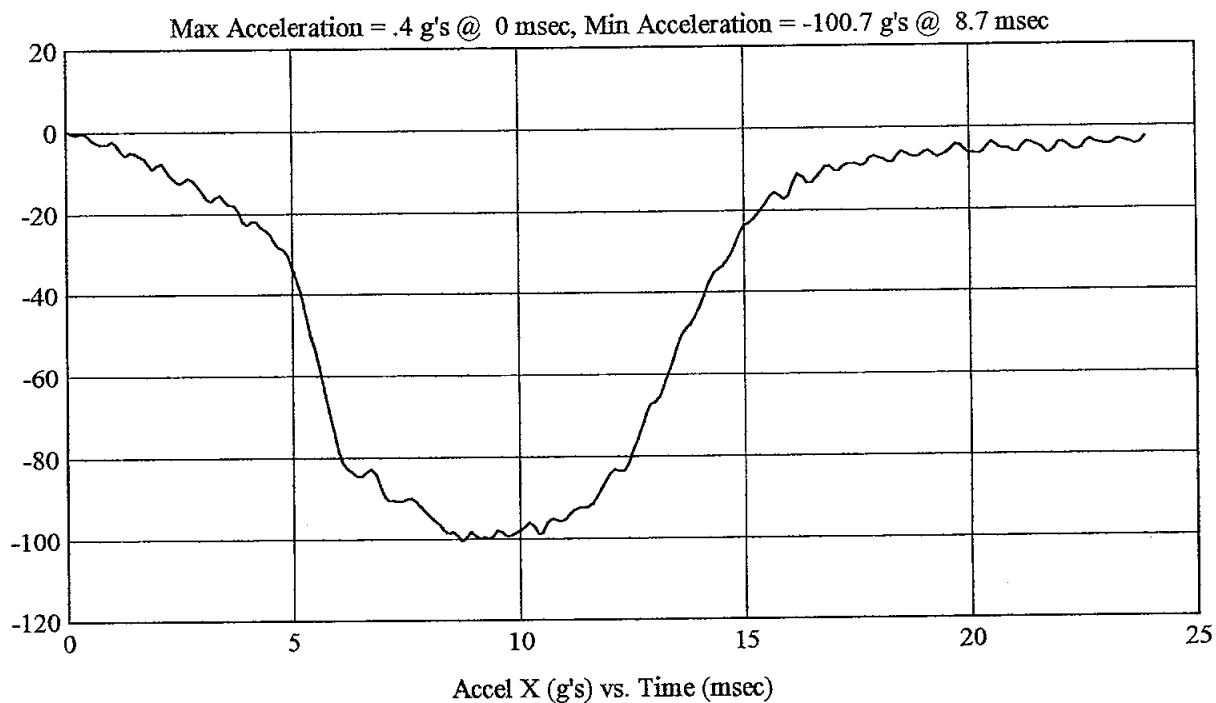
Customer: NHTSA
Test # 6
FM6170
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: UR3
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 630, HIC = 614, Delta T = 8 msec



FMH
G06I7-001.4

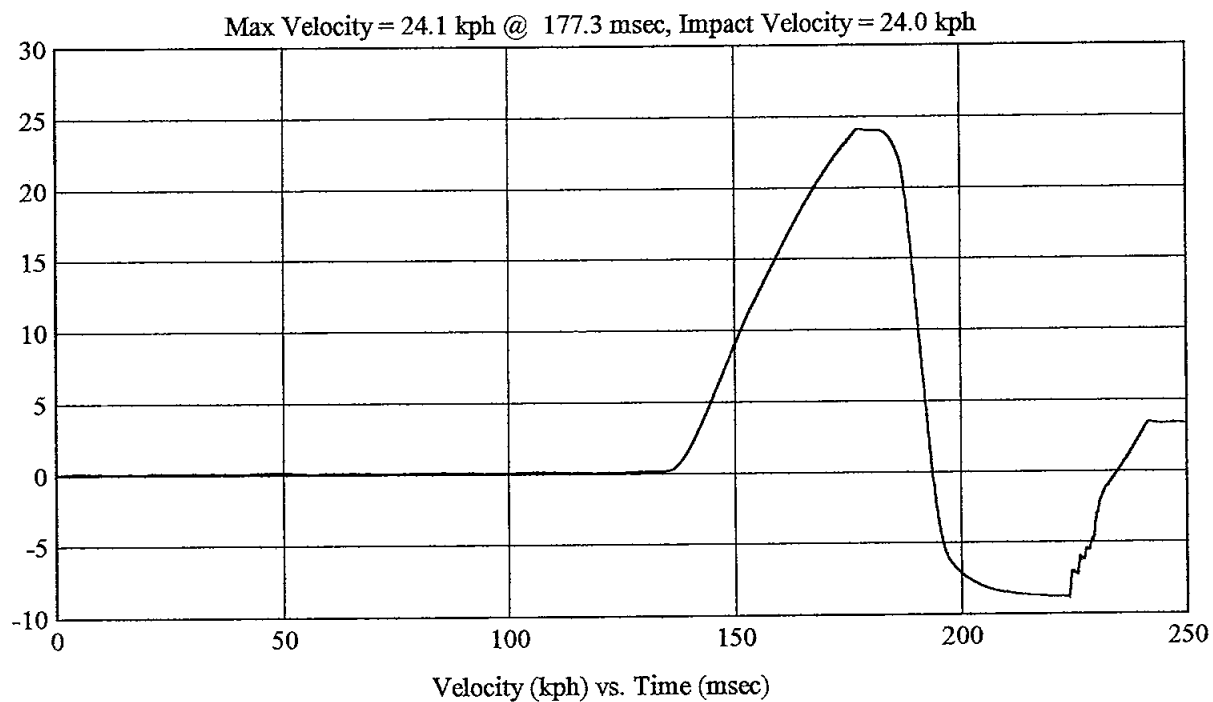
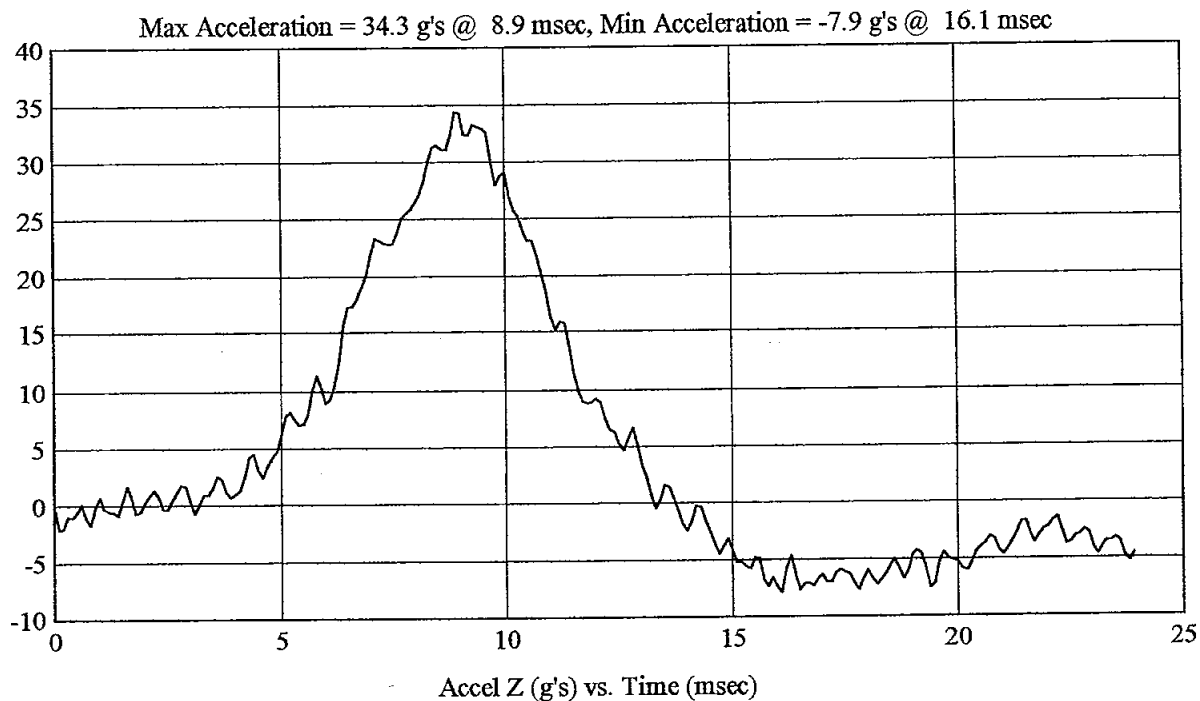
Customer: NHTSA
Test # 6
FM6170
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/20/06

Model Year: 2006
Target: UR3
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 630, HIC = 614, Delta T = 8 msec



FMH
G06I7-001.4

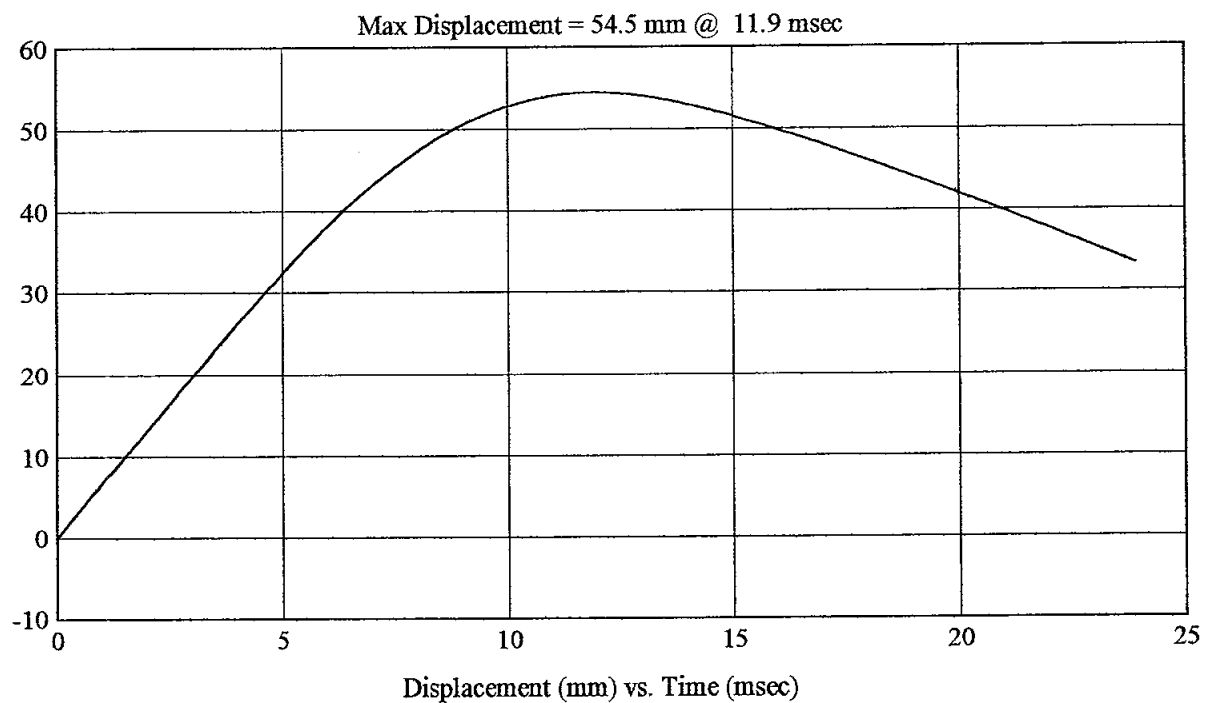
Customer: NHTSA
Test # 6
FM6170
Additional Desc: N/A

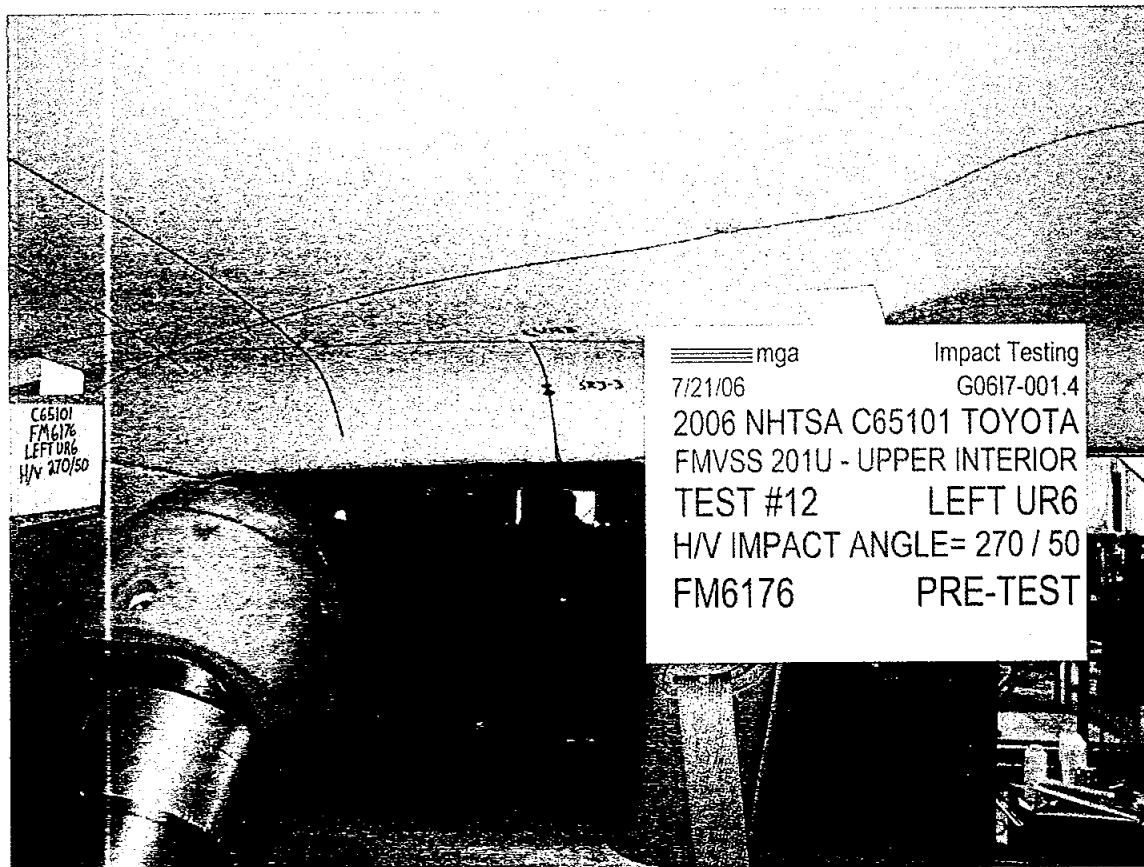
Vehicle Program : Toyota

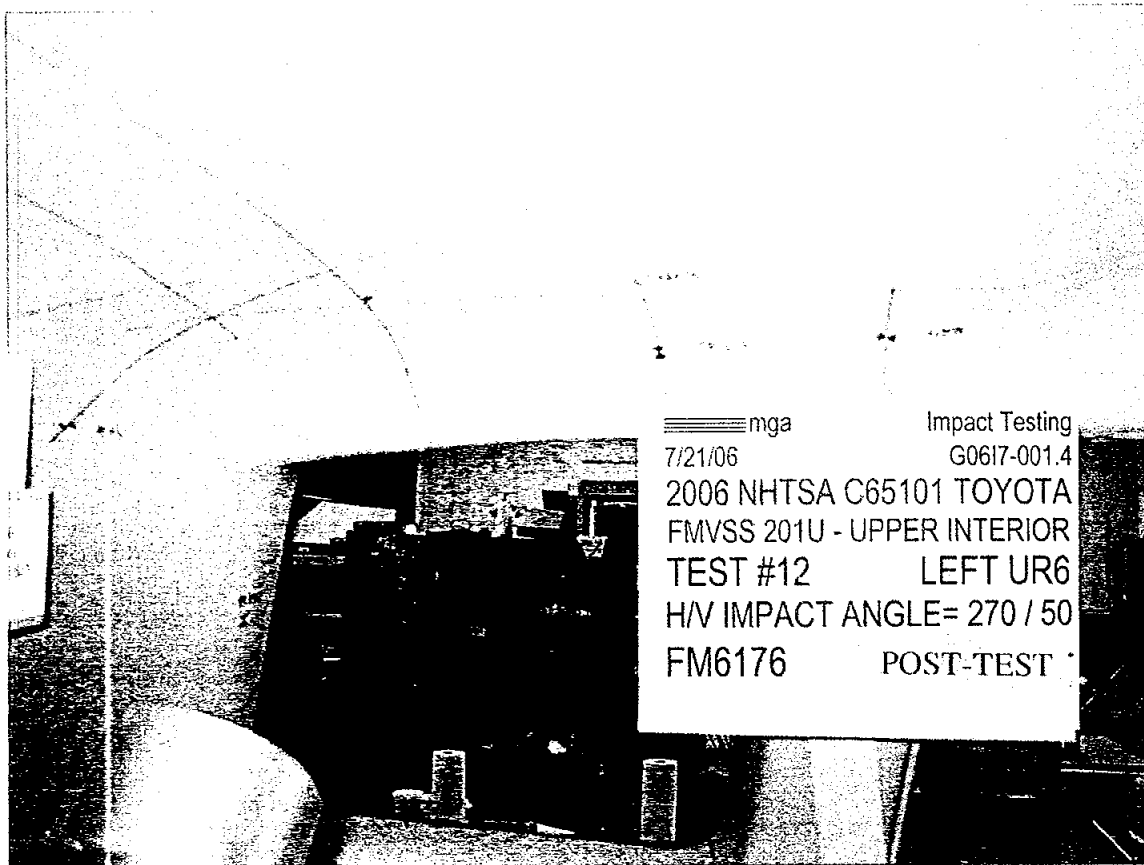
Test Date: 7/20/06

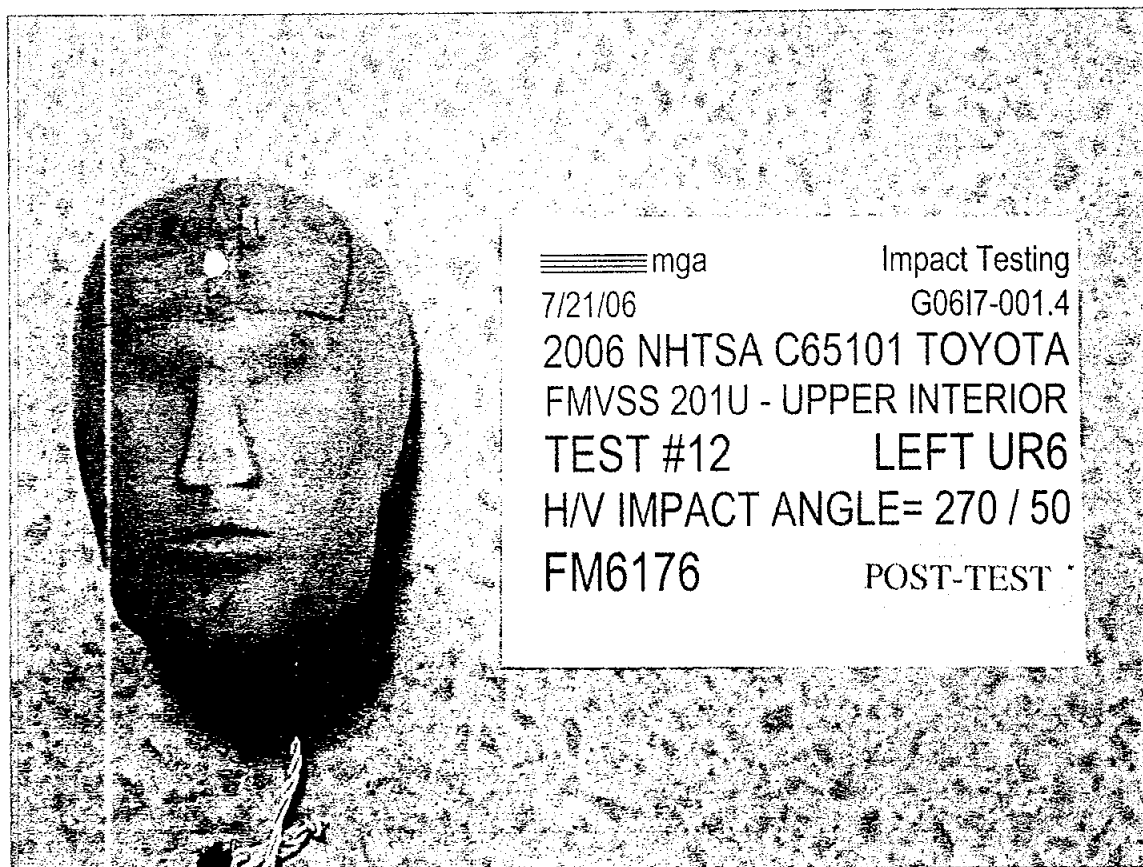
Model Year: 2006
Target: UR3
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 630, HIC = 614, Delta T = 8 msec









SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G06I7-001.4 VEHICLE YR/MAKE/MODEL:2006/NHTSA/Toyota

GENERAL TEST PARAMETERS:

Test Number:#12

Target (Vehicle Side): UR6 Left

Temperature:24C

MGA Test Reference No.:FM6176

Humidity:39%

Approach Horizontal Angles:270°

Time of Test:1:15 PM

Approach Vertical Angles:50°

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
716	729	7.5	24.2	23	3 L

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

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-108.8	1.55	1.54
Y	6	J36193	102.7	1.53	1.53
Z	7	J36353	97.2	1.45	1.45

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

No visible damage.

Recorded By: Matt Kerr Approved By*: Heena A. Kalita Date: 7/21/06
 *Only necessary for NHTSA (Government) Compliance testing.

FMH
G0617-001.4

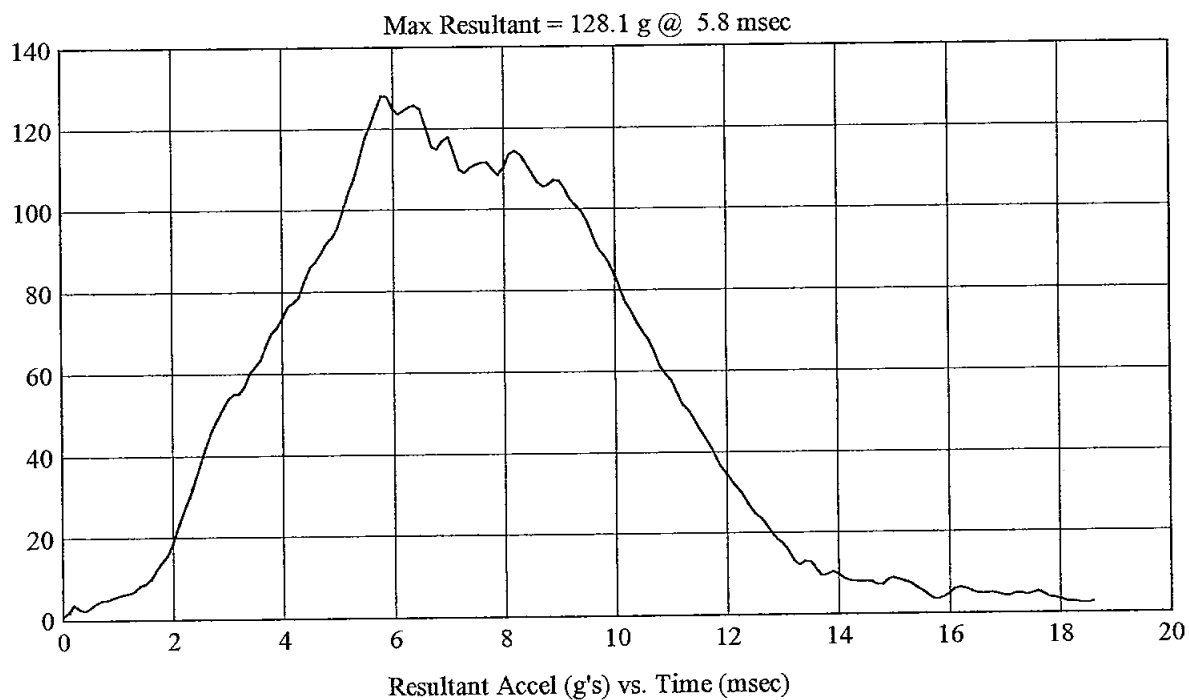
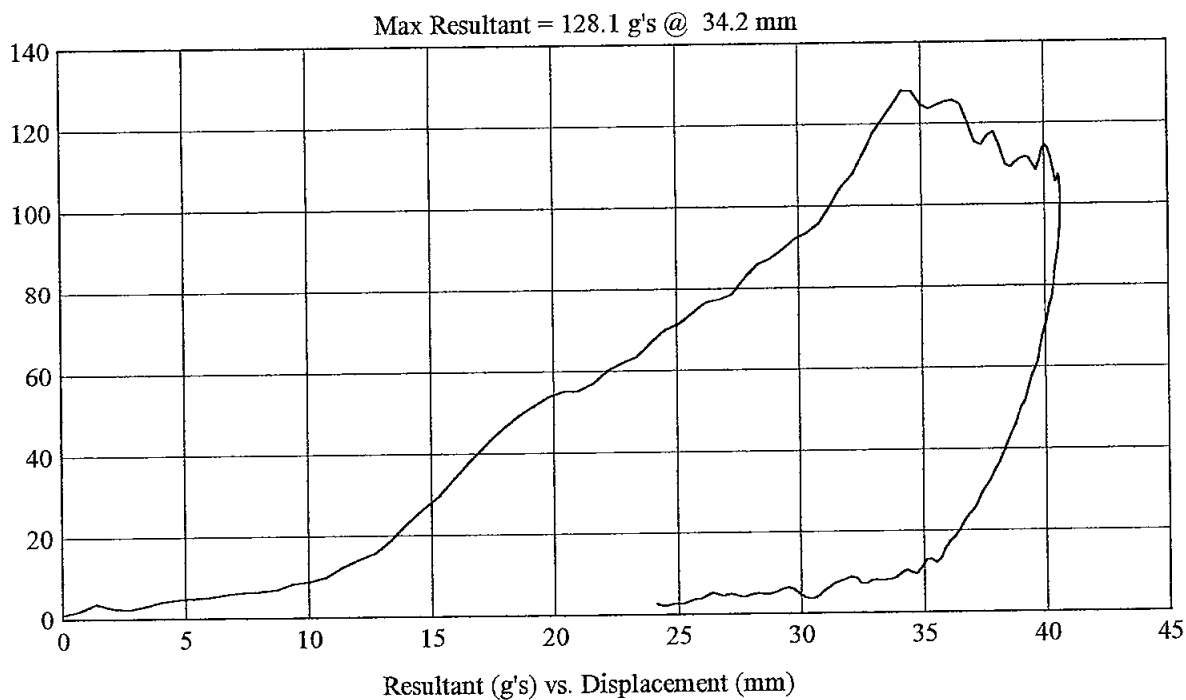
Customer: NHTSA
Test # 12
FM6176
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/21/06

Model Year: 2006
Target: UR6
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 716, HIC = 729, Delta T = 7.5 msec



FMH
G06I7-001.4

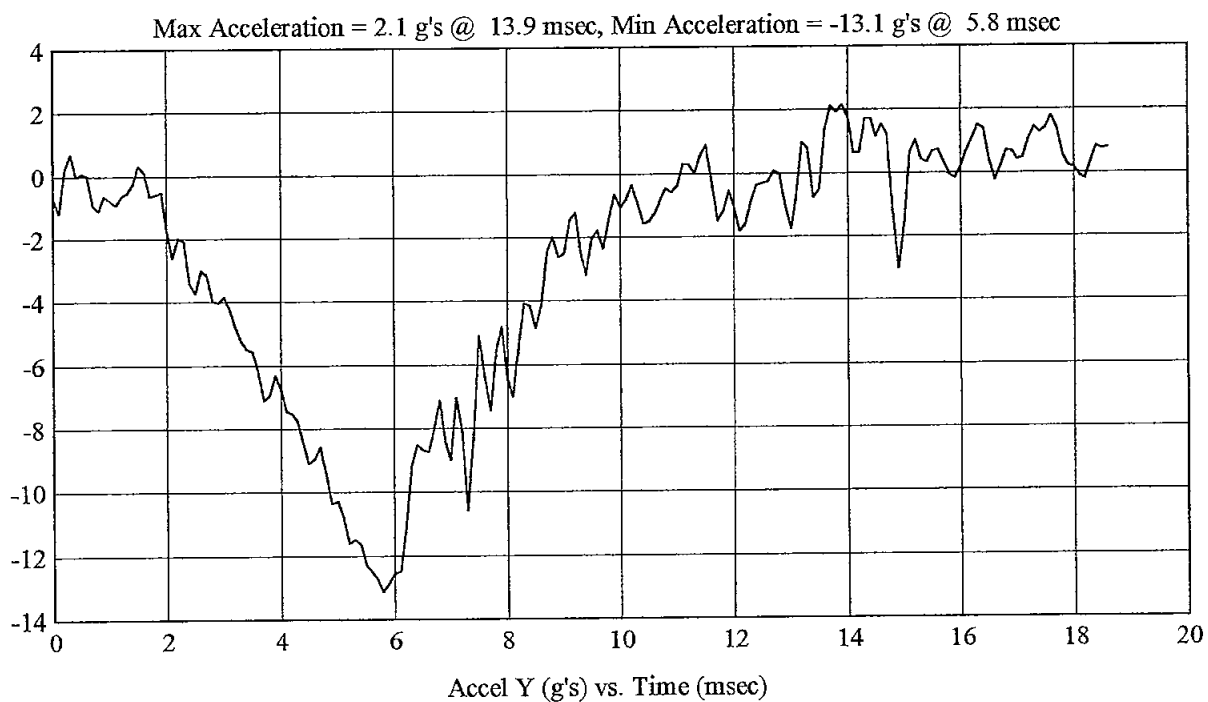
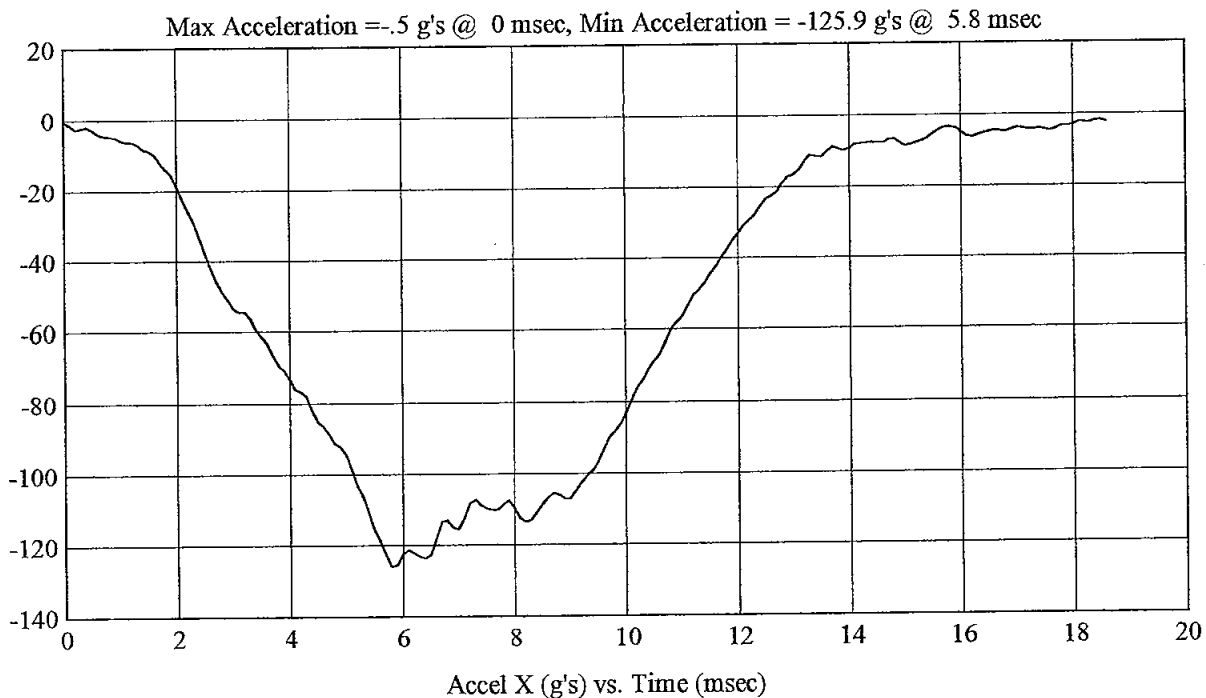
Customer: NHTSA
Test # 12
FM6176
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/21/06

Model Year: 2006
Target: UR6
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 716, HIC = 729, Delta T = 7.5 msec



FMH
G06I7-001.4

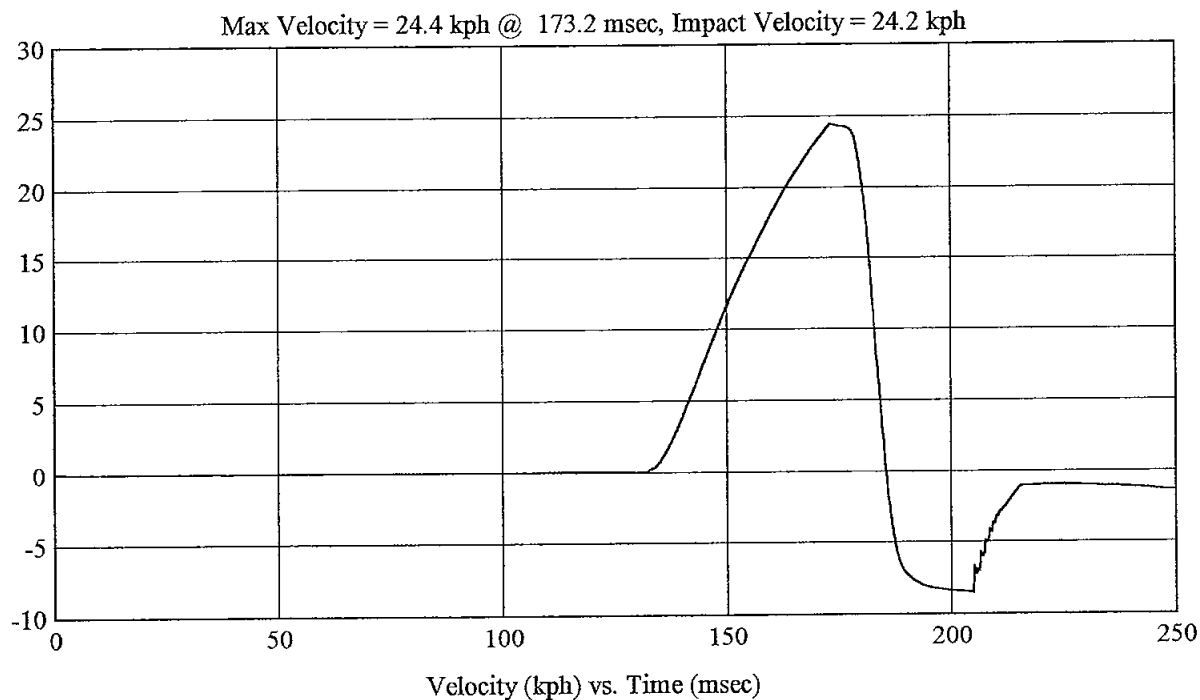
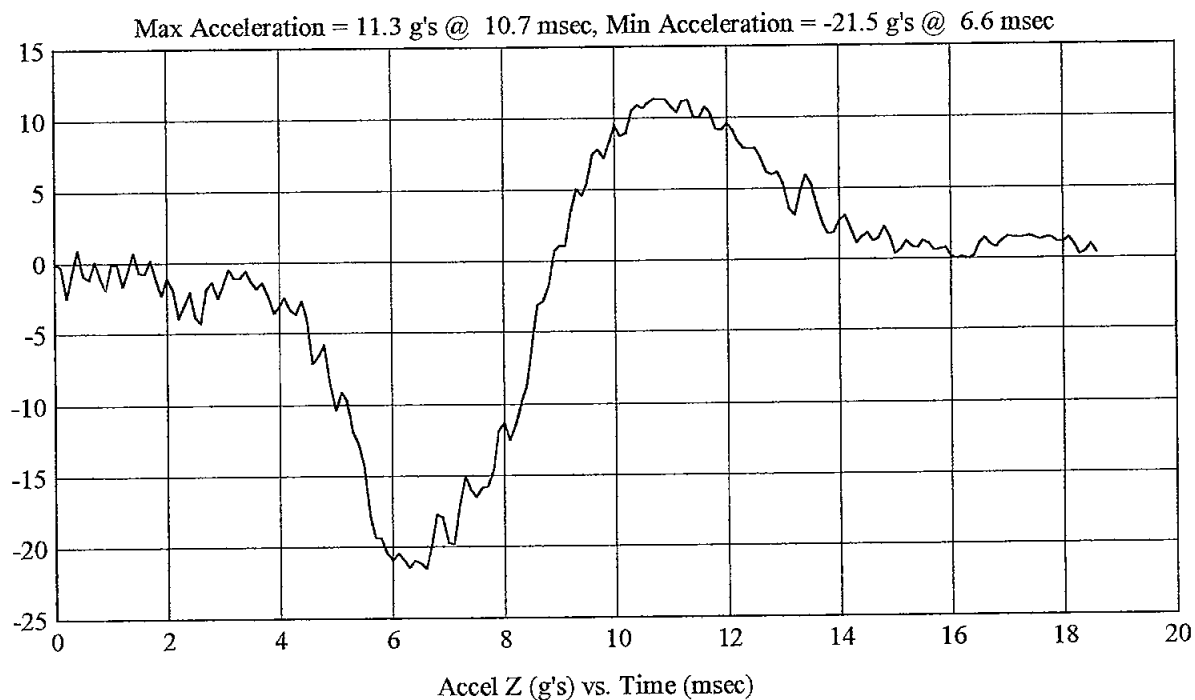
Customer: NHTSA
Test # 12
FM6176
Additional Desc: N/A

Vehicle Program : Toyota

Test Date: 7/21/06

Model Year: 2006
Target: UR6
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 716, HIC = 729, Delta T = 7.5 msec



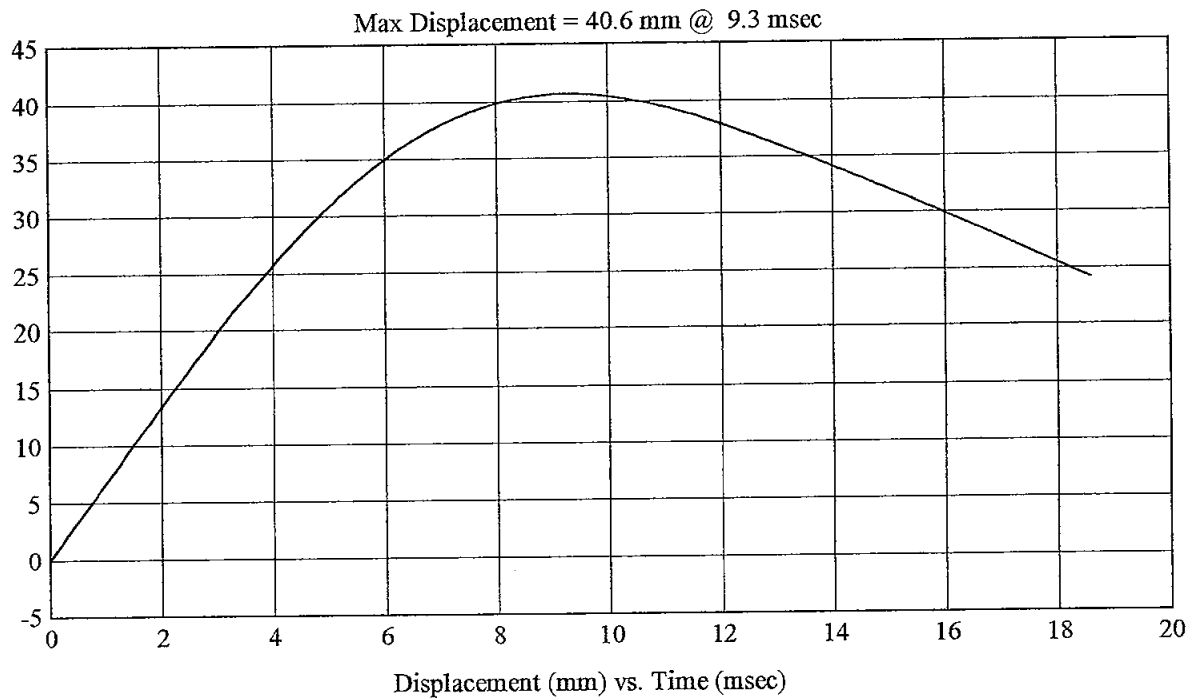
FMH
G06I7-001.4

Customer: NHTSA
Test # 12
FM6176
Additional Desc: N/A

Vehicle Program : Toyota
Test Date: 7/21/06

Model Year: 2006
Target: UR6
Vehicle Side: Left
Horz/Vert Angle: 270/50

HIC(d) = 716, HIC = 729, Delta T = 7.5 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 66°F and 78°F (19°C - 26°C) 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
*Digital Inclinator	Mitutoyo	PRO 360 (MGA00048)	Set Angle of FMH/Targeting	0.1°	Annual
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	035 038 039	Test Device	N/A	Pre and Post-Test Series
High Speed Video	Redlake	HGLE	Record Event	N/A	N/A
*FARO™	Faro Technologies	S08059801273	Targeting	0.1 mm	Annual
Measuring Devices: - Tape Measure - Plumb Bobs - Digital Protractor	Stanley N/A Mitutoyo	675 -- MGA00048	Measurement Targeting FMH setup Horizontal Measurement	1 mm N/A 0.5°	Annual
*Vehicle Scale	SW Scales	26032389	Weighing Vehicle	± .5 kg	Annual
* Scale	Ohaus	1264112535330P	Weigh FMH Head	± 0.01 lb	Annual
*Temperature Recorder	Dickson	TM-325 (MGA00146)	Record Temperature and Humidity	± 1°C ± 1% RH	Annual

TABLE 4-2 FMH CALIBRATION SUMMARY DATA SUMMARY TABLE

FMH Serial #		Weight (lbs)	Temp (°C)	% Humidity	Peak Resultant Acceleration (G's)	Peak Lateral Acceleration (G's)	Unimodal
Pre	#35	10.02	23.0	38.0	239.5	2.8	Yes
Post	#35	10.02	25.0	49.0	255.0	10.8	Yes
Pre	#38	9.92	22.0	44.0	260.6	7.1	Yes
Post	#38	9.92	25.0	49.0	262.6	10.0	Yes
Pre	#39	10.00	22.0	44.0	246.1	3.1	Yes
Post	#39	10.00	25.0	49.0	253.3	7.2	Yes

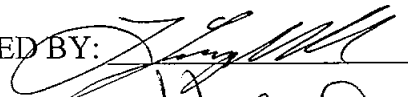
RECORDED BY: Matt KerrDATE: July 26, 2006APPROVED BY: Helen A. Kaleto

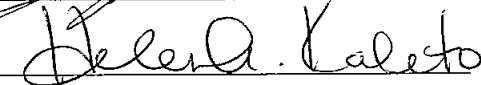
HEAD DROP TEST SUMMARY **PART 572L**

HEADFORM SERIAL NUMBER: 035		CALIBRATION DATE: 07/19/2006
		CALIBRATION TIME: 4:15:01 PM
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.02
Temperature	19° C to 26° C	23
Relative Humidity	10% to 70%	38
Peak Resultant Acceleration	225 G's to 275 G's	239.5
Peak Lateral Acceleration	15 G's Maximum	2.8
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	J35924	04/06/06	10/06/06
2	ENDEVCO	7264-2000	J35919	04/06/06	10/06/06
3	ENDEVCO	7264-2000	J22664	04/06/06	10/06/06

REMARKS:

RECORDED BY:  DATE: 07/19/2006

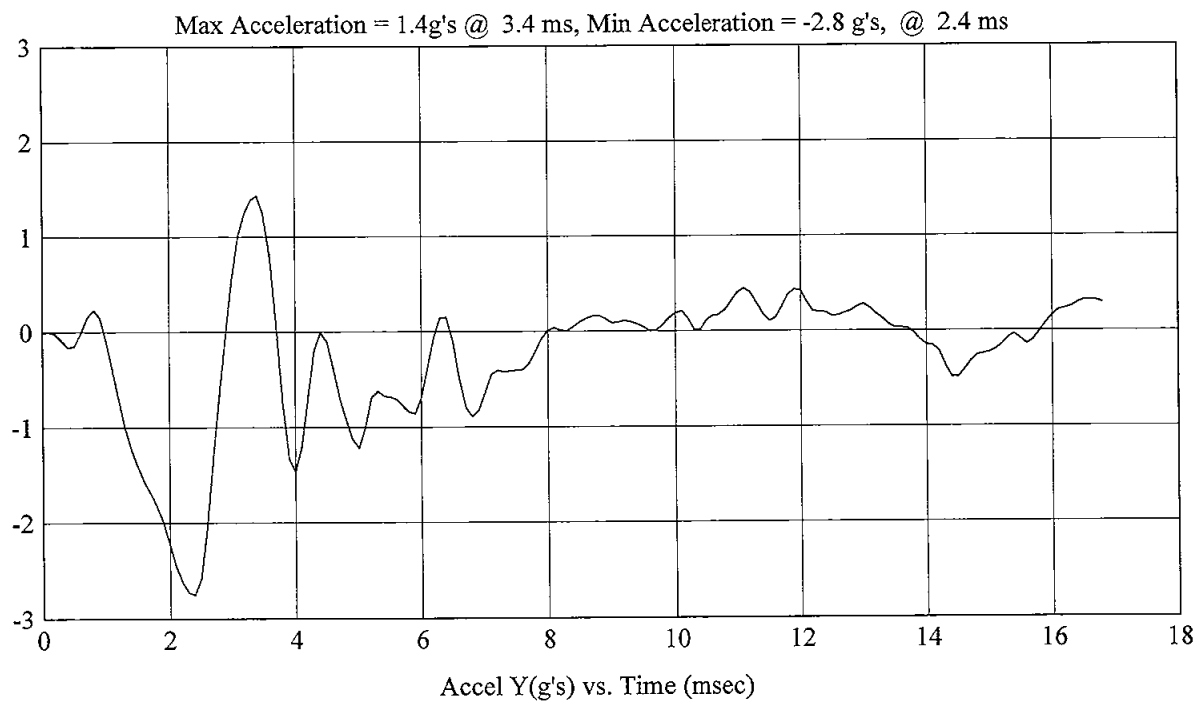
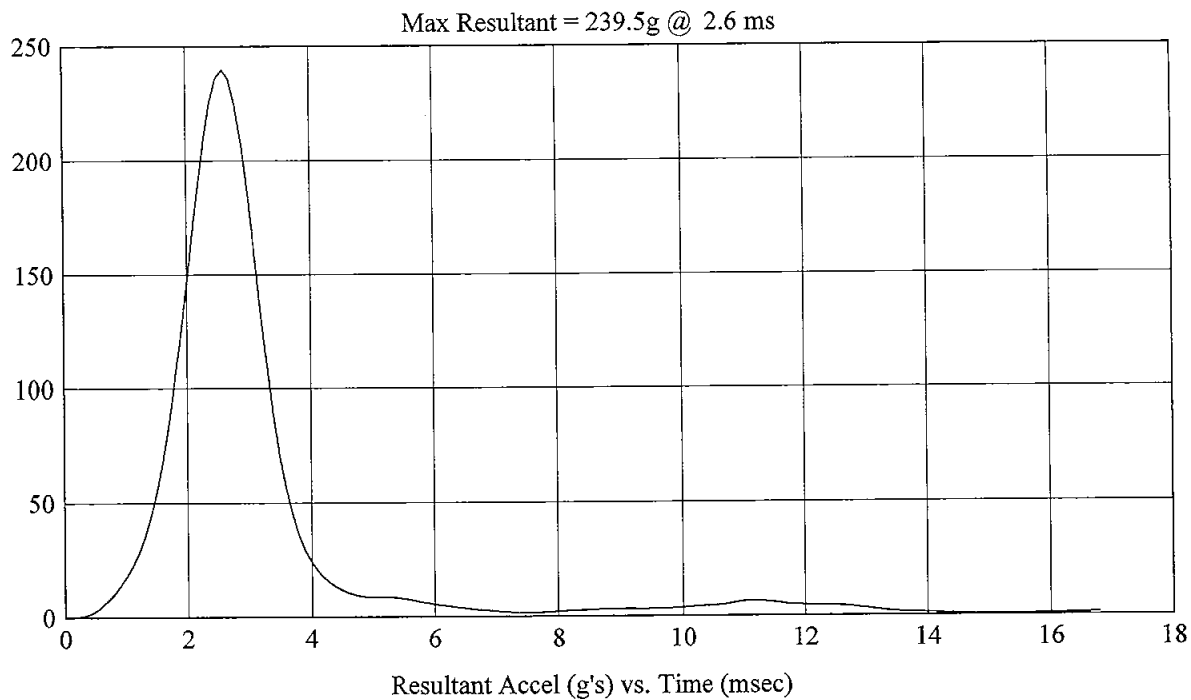
APPROVED BY: 

Head Drop
(Preliminary Test Report)

Test Number: H35323
Test Description: Pre

MGA Job Number: G06I7-001.4

Test Date: 07/19/2006
Head #: 035

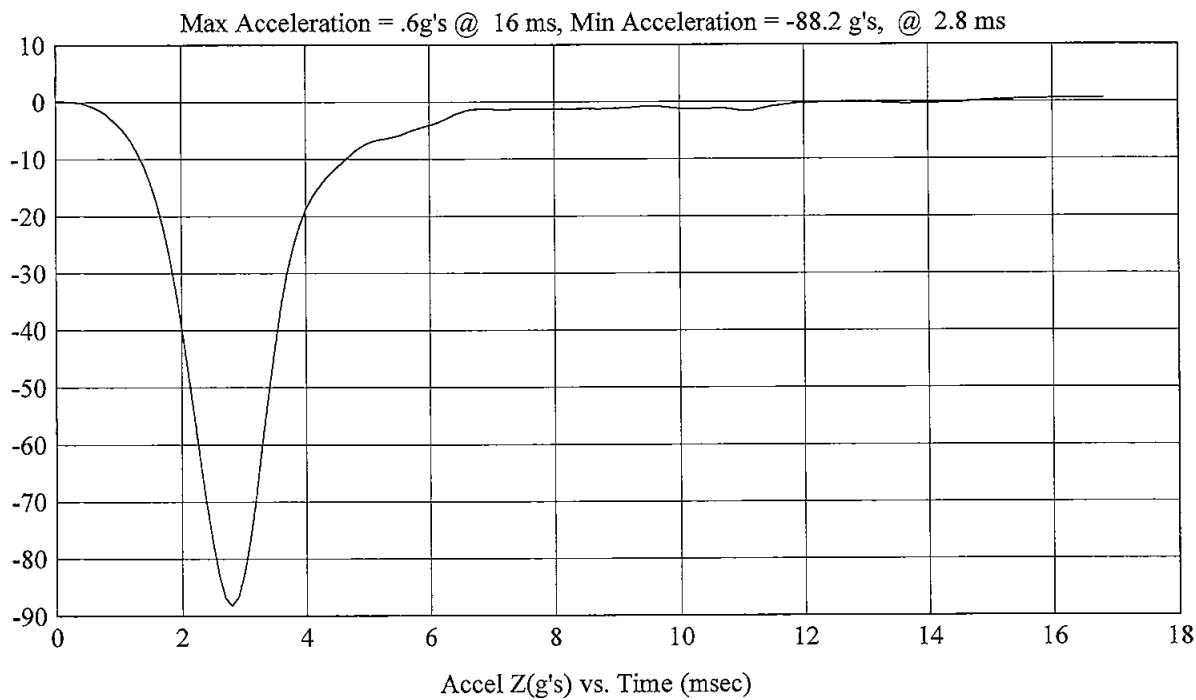
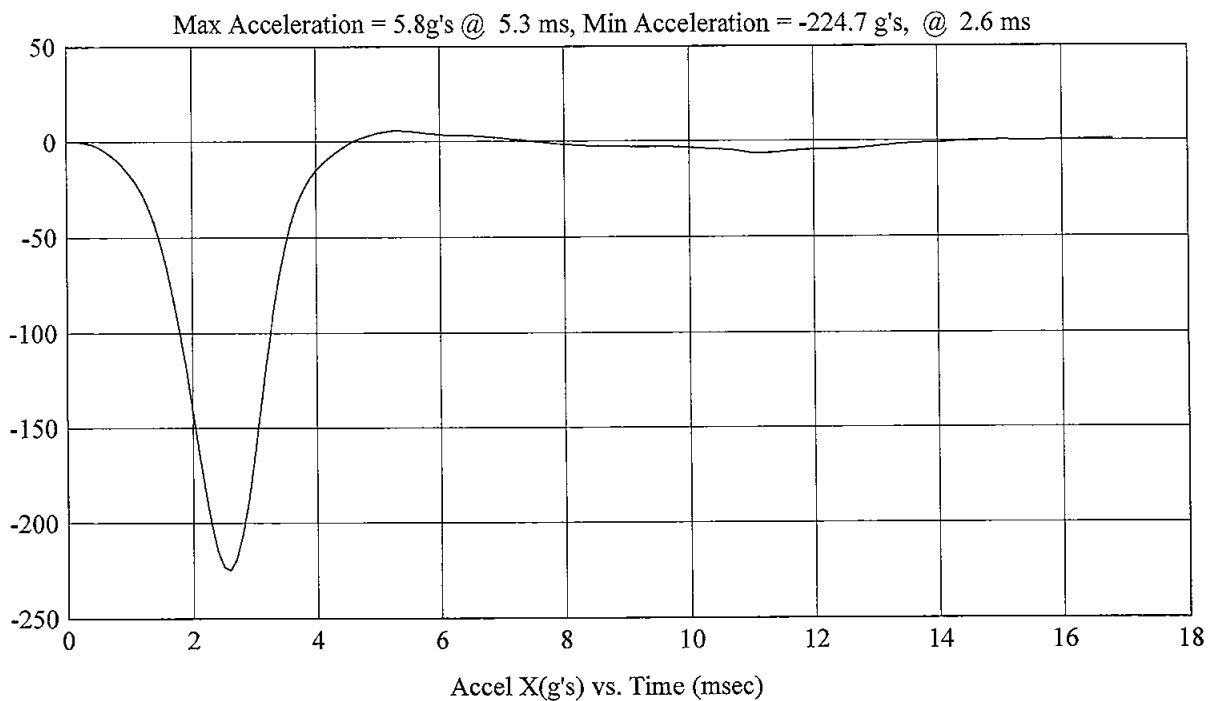


Head Drop
(Preliminary Test Report)

Test Number: H35323
Test Description: Pre

MGA Job Number: G06I7-001.4

Test Date: 07/19/2006
Head #: 035

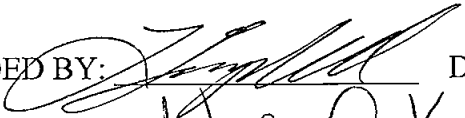
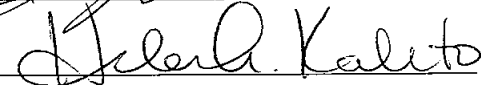


HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: 035		CALIBRATION DATE: 07/26/2006
		CALIBRATION TIME: 4:21:00 PM
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.02
Temperature	19° C to 26° C	25
Relative Humidity	10% to 70%	49
Peak Resultant Acceleration	225 G's to 275 G's	255.0
Peak Lateral Acceleration	15 G's Maximum	10.8
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	J35924	04/06/06	10/06/06
2	ENDEVCO	7264-2000	J35919	04/06/06	10/06/06
3	ENDEVCO	7264-2000	J22664	04/06/06	10/06/06

REMARKS:

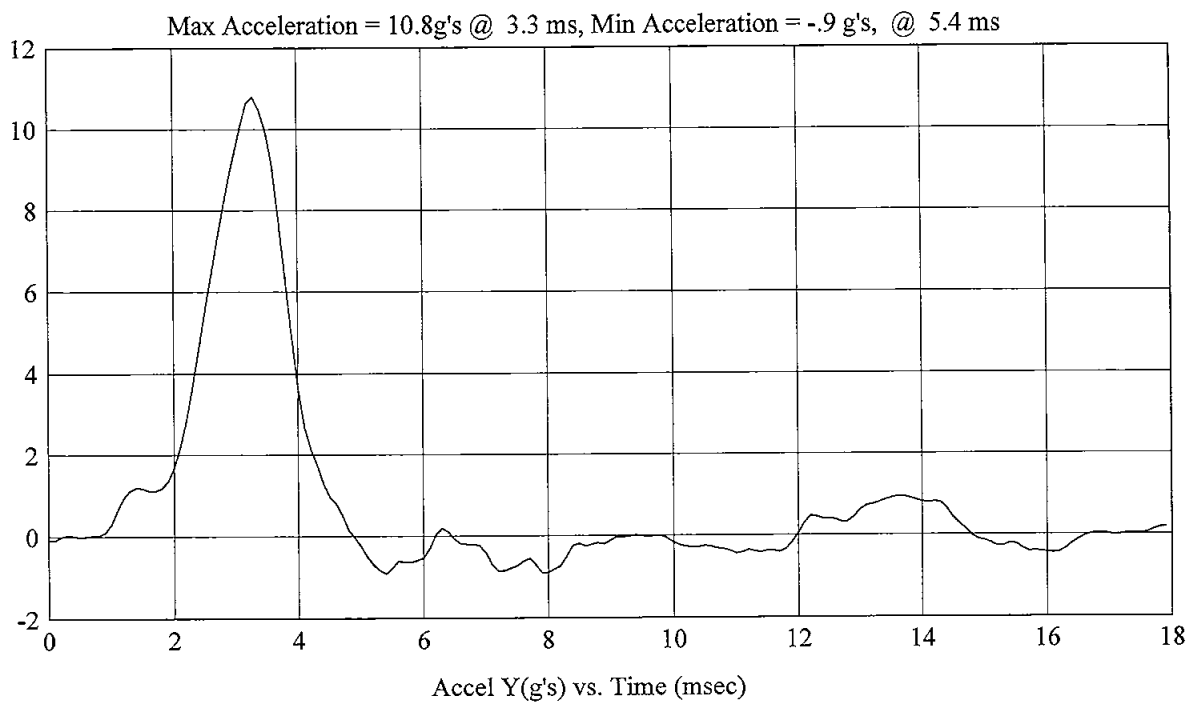
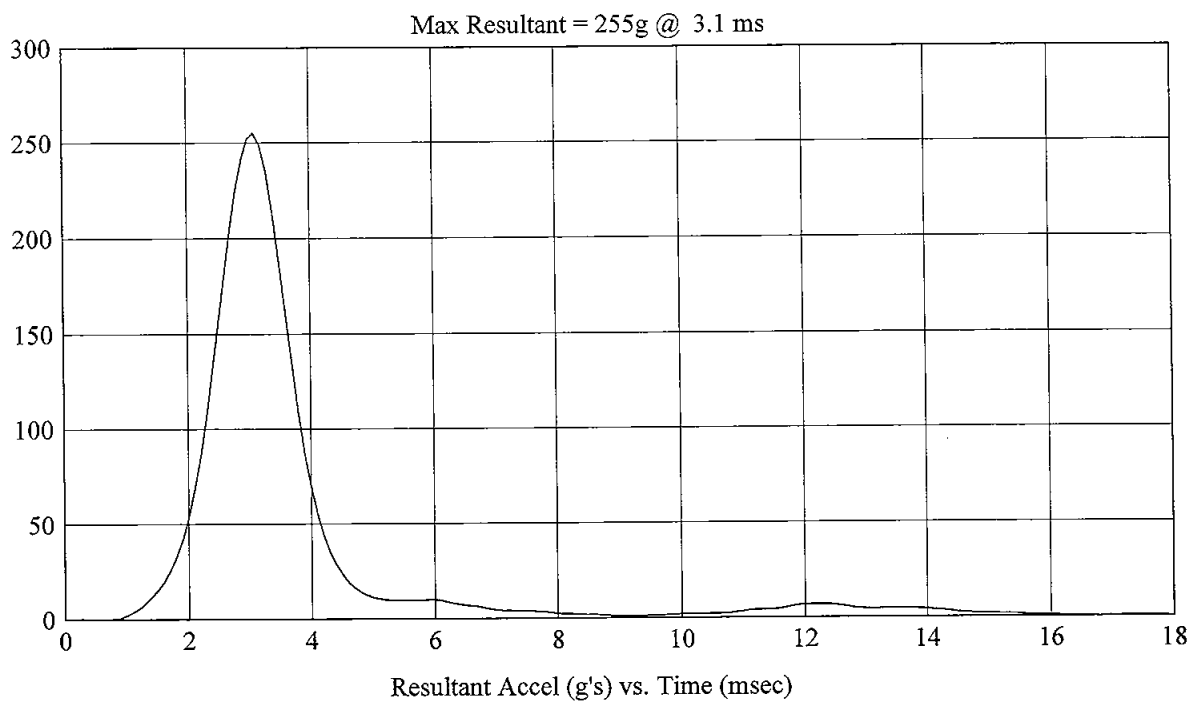
RECORDED BY:  DATE: 07/26/2006APPROVED BY: 

Head Drop
(Preliminary Test Report)

Test Number: H35324
Test Description: Post

MGA Job Number: G06I7-001.4

Test Date: 07/26/2006
Head #: 035

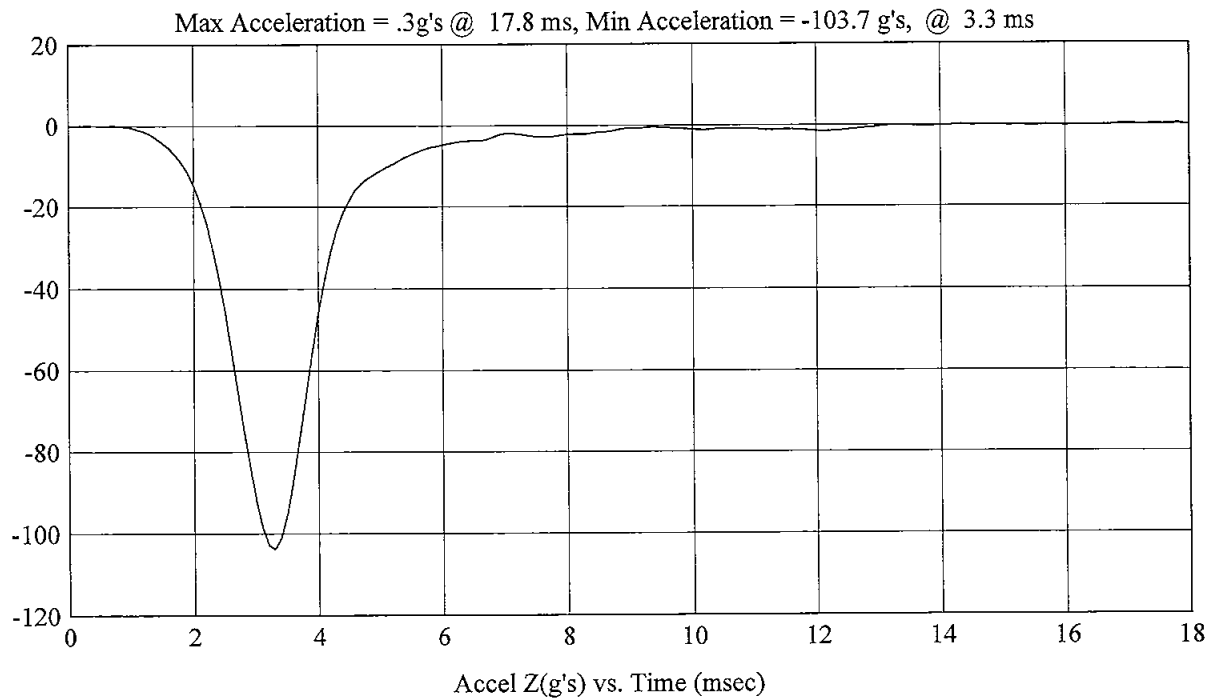
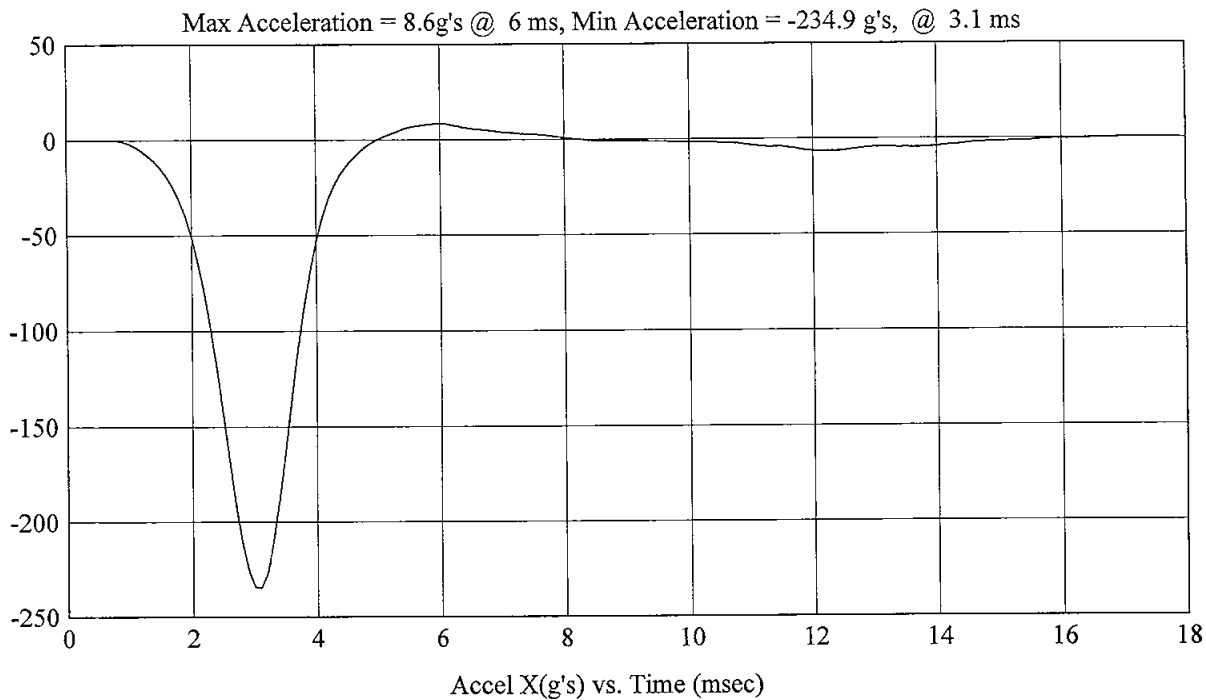


Head Drop
(Preliminary Test Report)

Test Number: H35324
Test Description: Post

MGA Job Number: G06I7-001.4

Test Date: 07/26/2006
Head #: 035

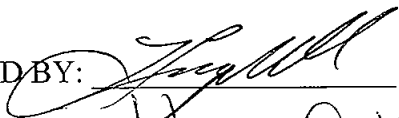
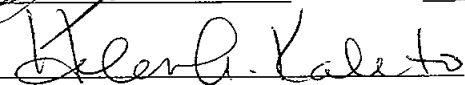


HEAD DROP TEST SUMMARY **PART 572L**

HEADFORM SERIAL NUMBER: 038		CALIBRATION DATE: 07/14/2006
		CALIBRATION TIME: 4:27:20 PM
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.92
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	44
Peak Resultant Acceleration	225 G's to 275 G's	260.6
Peak Lateral Acceleration	15 G's Maximum	7.1
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	J36197	04/07/06	10/07/06
2	ENDEVCO	7264-2000	J36193	04/07/06	10/07/06
3	ENDEVCO	7264-2000	J36353	04/07/06	10/07/06

REMARKS:

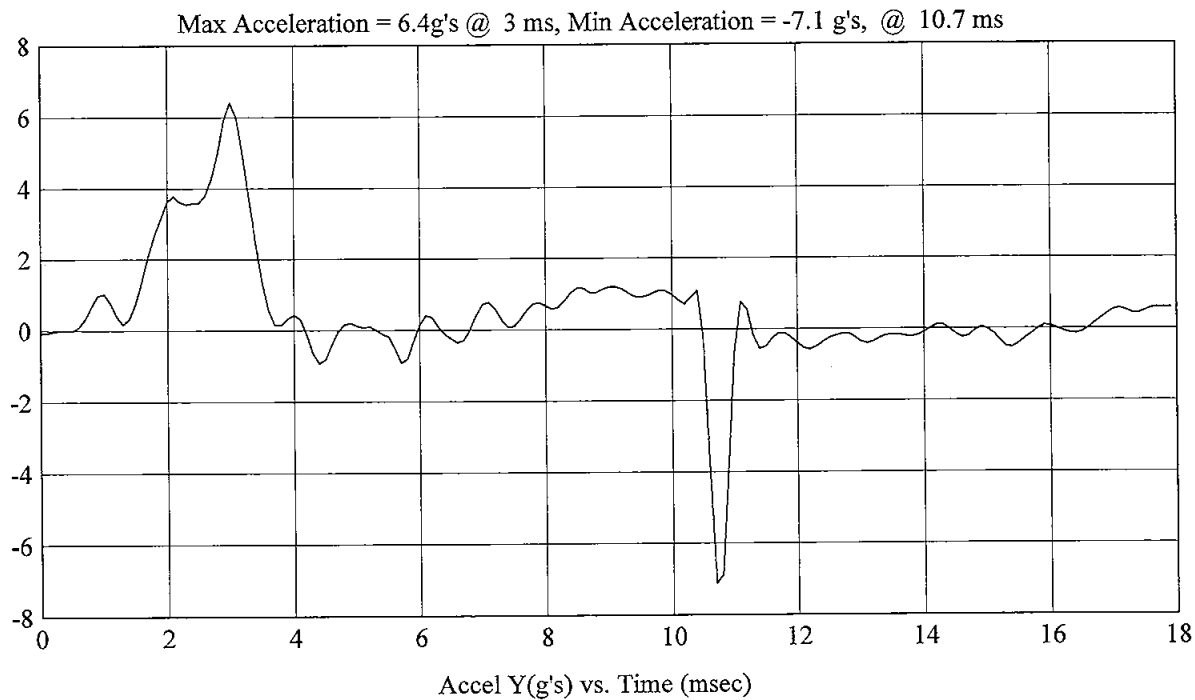
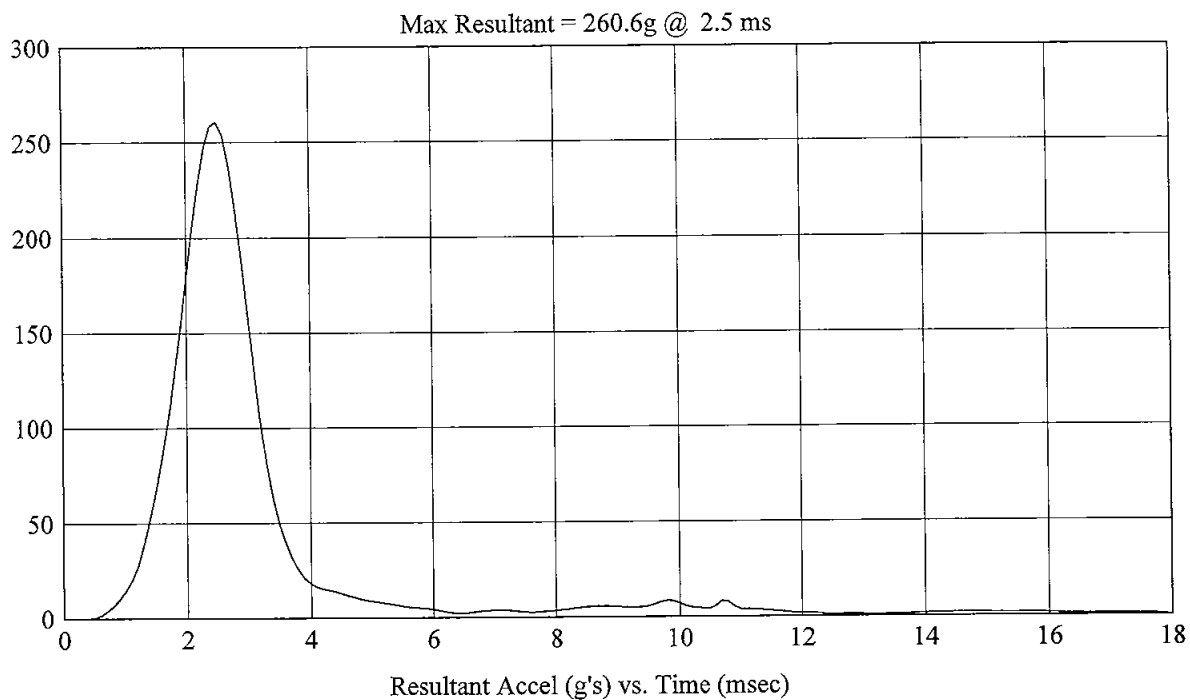
RECORDED BY:  DATE: 07/14/2006APPROVED BY: 

Head Drop
(Preliminary Test Report)

Test Number: H38299
Test Description: Pre

MGA Job Number: G06I7-001.4

Test Date: 07/14/2006
Head #: 038

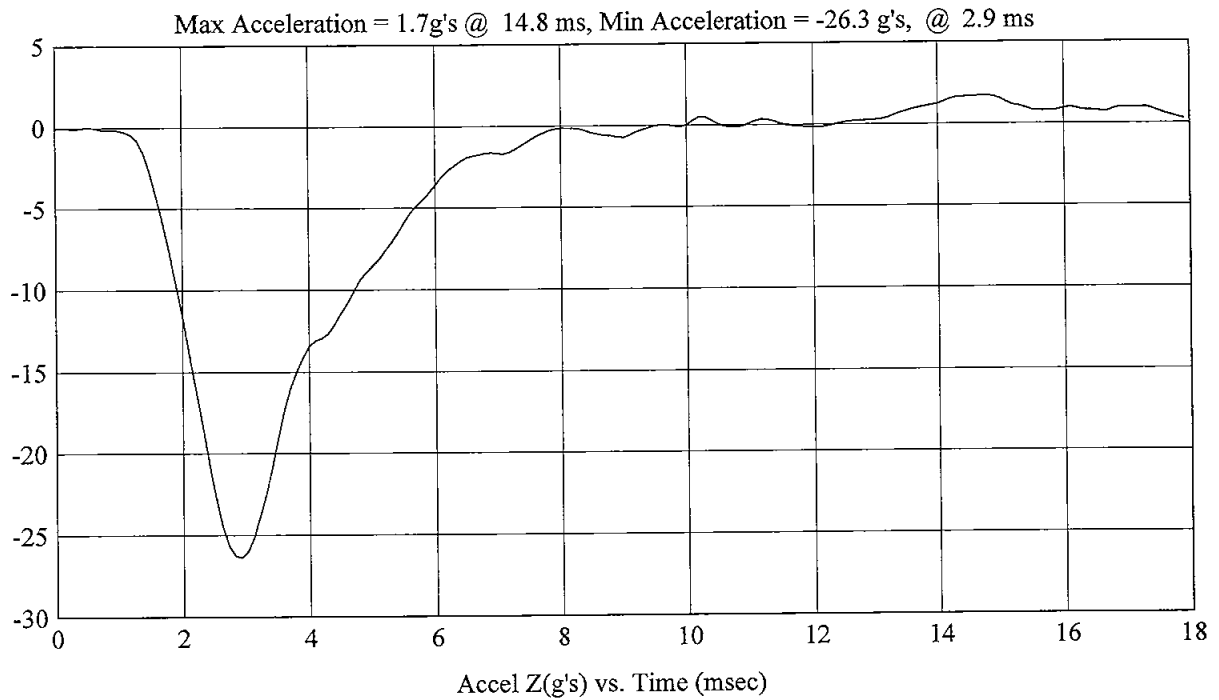
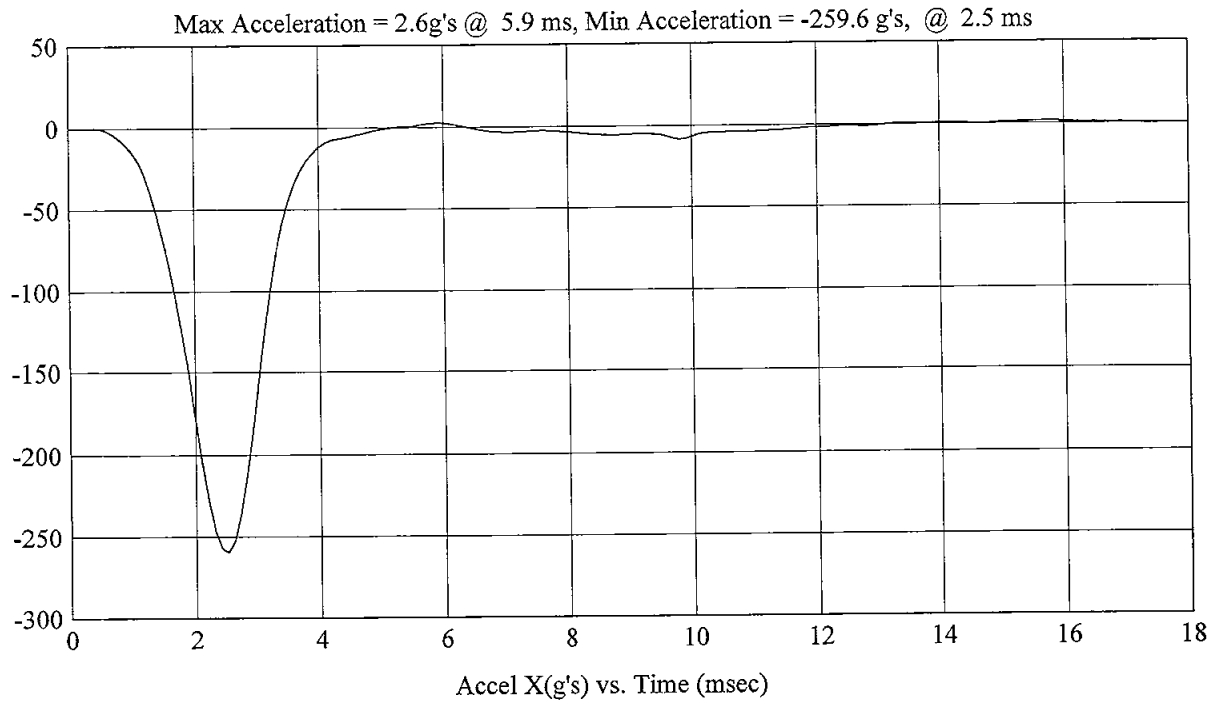


Head Drop
(Preliminary Test Report)

Test Number: H38299
Test Description: Pre

MGA Job Number: G06I7-001.4

Test Date: 07/14/2006
Head # : 038

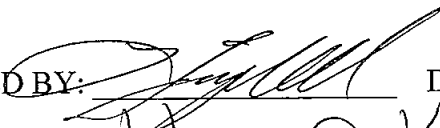
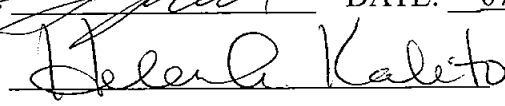


HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: 038		CALIBRATION DATE: 07/26/2006
		CALIBRATION TIME: 4:31:48 PM
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.92
Temperature	19° C to 26° C	25
Relative Humidity	10% to 70%	49
Peak Resultant Acceleration	225 G's to 275 G's	262.6
Peak Lateral Acceleration	15 G's Maximum	10.0
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	J36197	04/07/06	10/07/06
2	ENDEVCO	7264-2000	J36193	04/07/06	10/07/06
3	ENDEVCO	7264-2000	J36353	04/07/06	10/07/06

REMARKS:

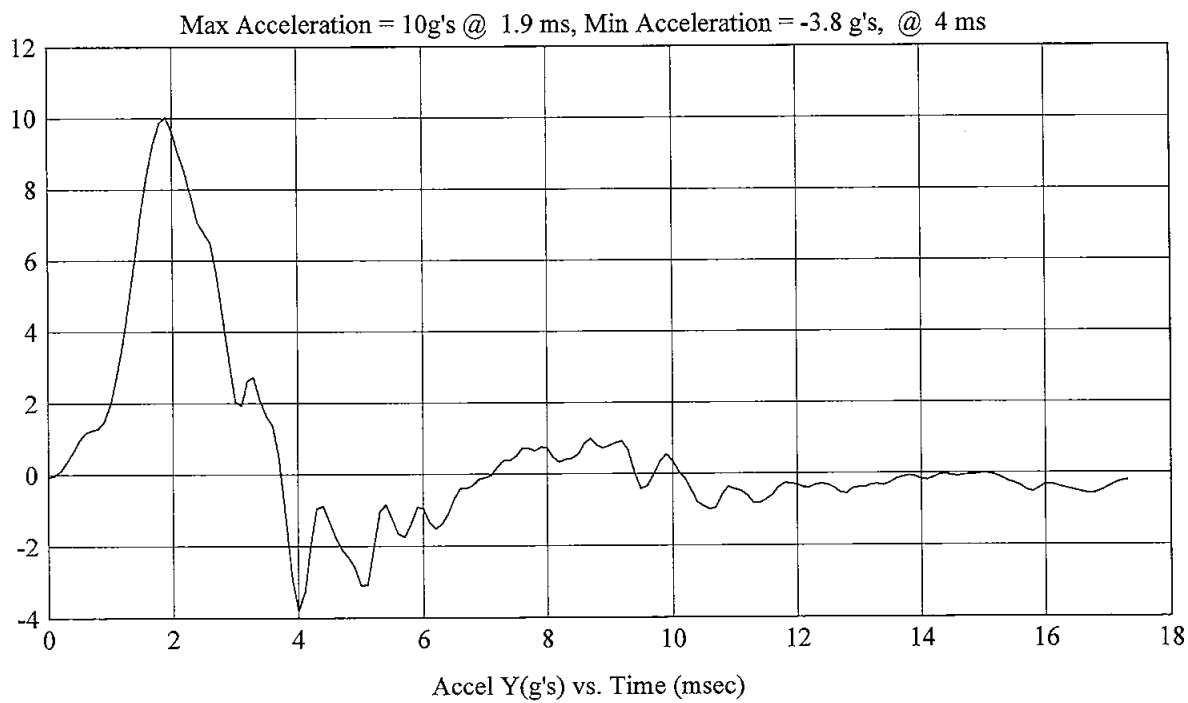
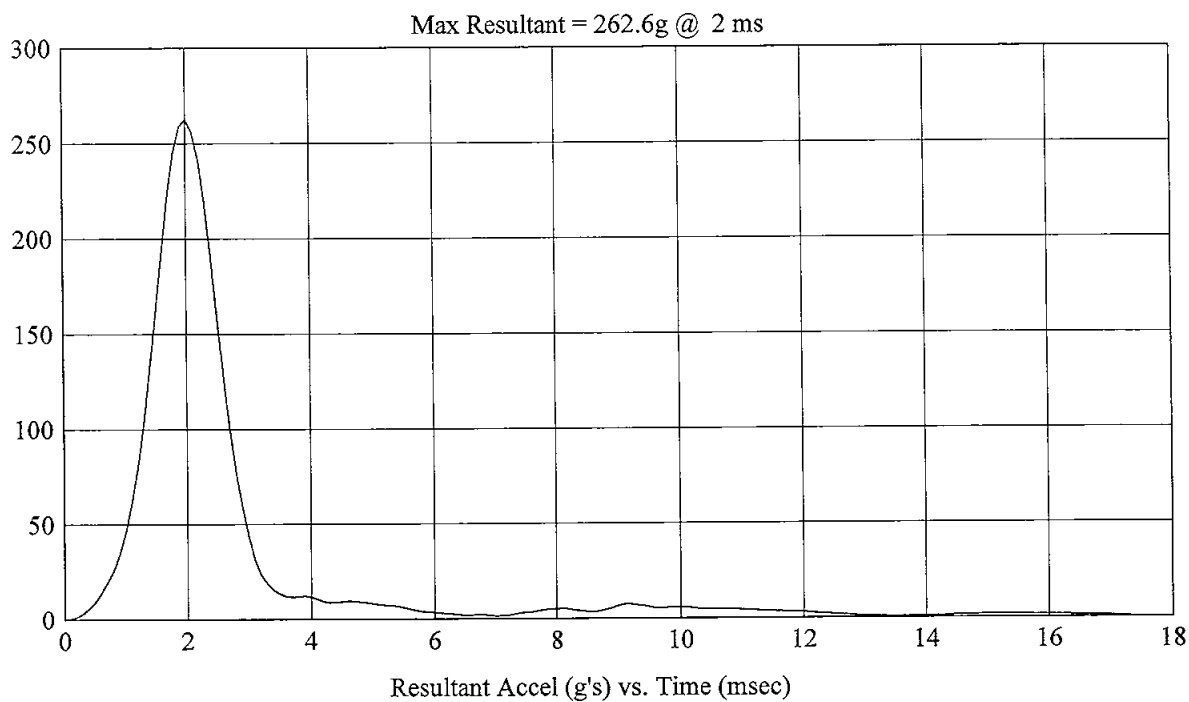
RECORDED BY:  DATE: 07/26/2006APPROVED BY: 

Head Drop
(Preliminary Test Report)

Test Number: H38300
Test Description: Post

MGA Job Number: G0617-001.4

Test Date: 07/26/2006
Head #: 038

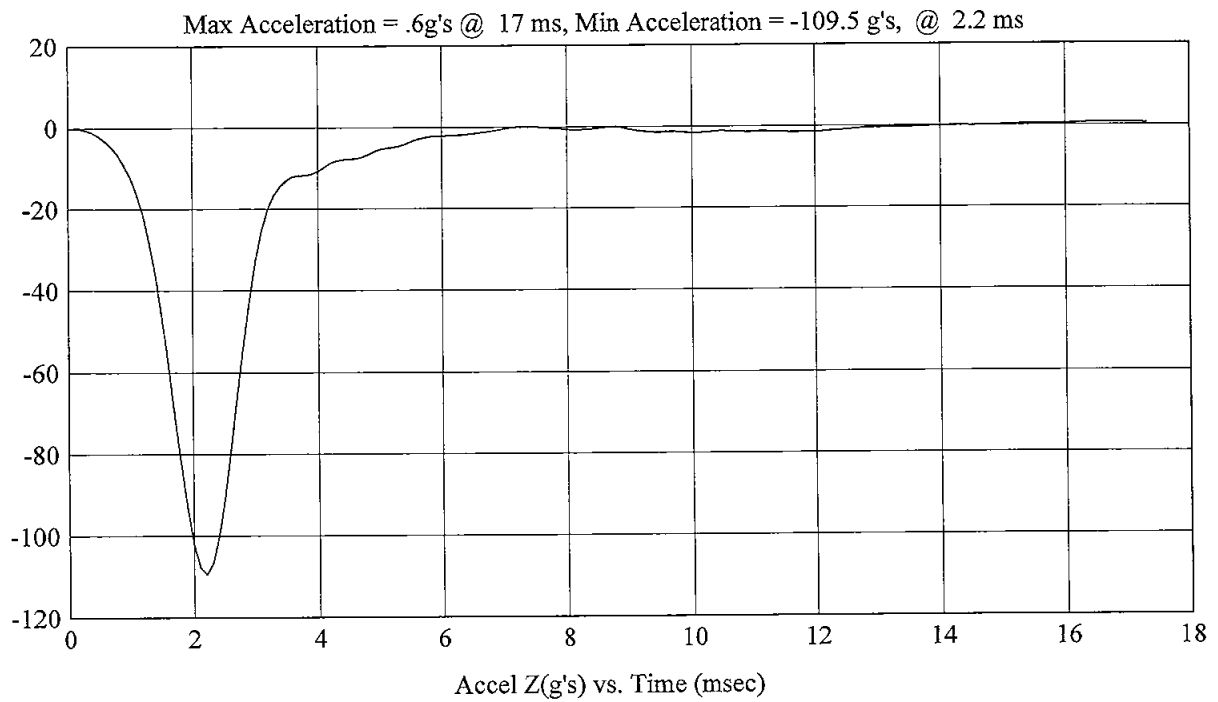
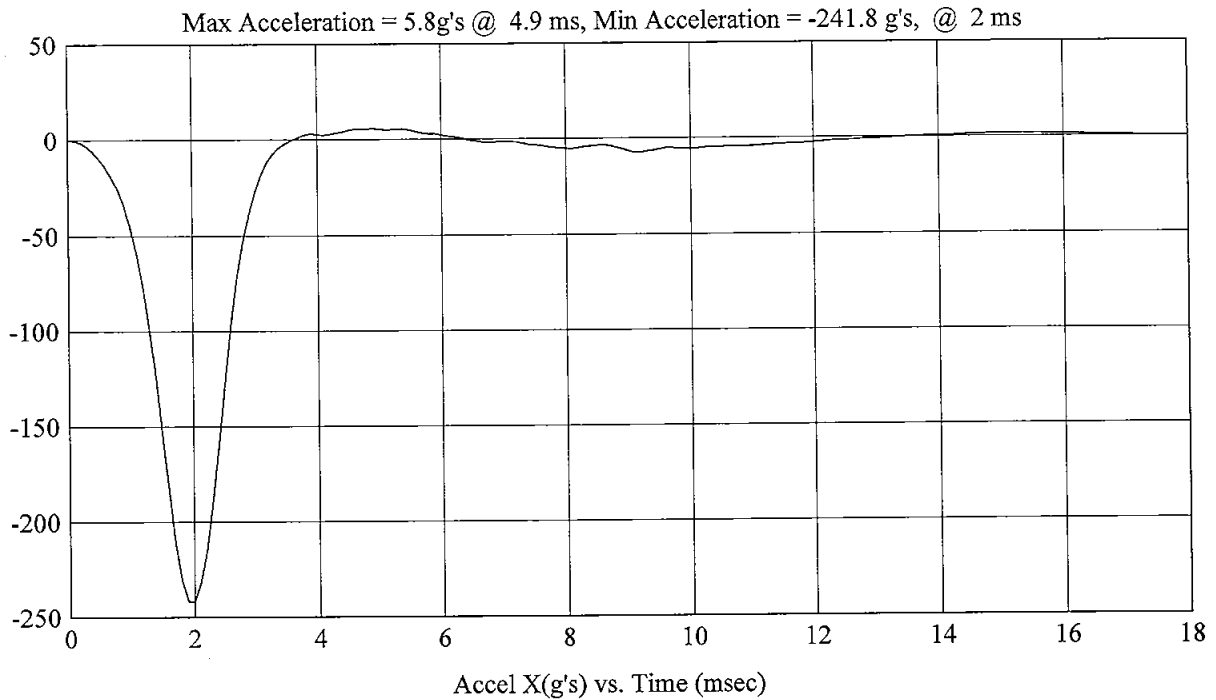


Head Drop
(Preliminary Test Report)

Test Number: H38300
Test Description: Post

MGA Job Number: G06I7-001.4

Test Date: 07/26/2006
Head #: 038

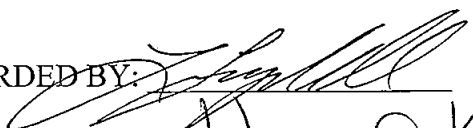
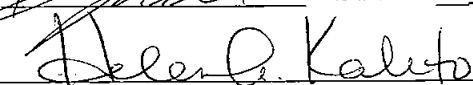


HEAD DROP TEST SUMMARY **PART 572L**

HEADFORM SERIAL NUMBER: 039		CALIBRATION DATE: 07/14/2006
		CALIBRATION TIME: 4:34:14 PM
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.00
Temperature	19° C to 26° C	22
Relative Humidity	10% to 70%	44
Peak Resultant Acceleration	225 G's to 275 G's	246.1
Peak Lateral Acceleration	15 G's Maximum	3.1
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	J13753	04/07/06	10/07/06
2	ENDEVCO	7264-2000	J22700	04/07/06	10/07/06
3	ENDEVCO	7264-2000	J32734	04/07/06	10/07/06

REMARKS:

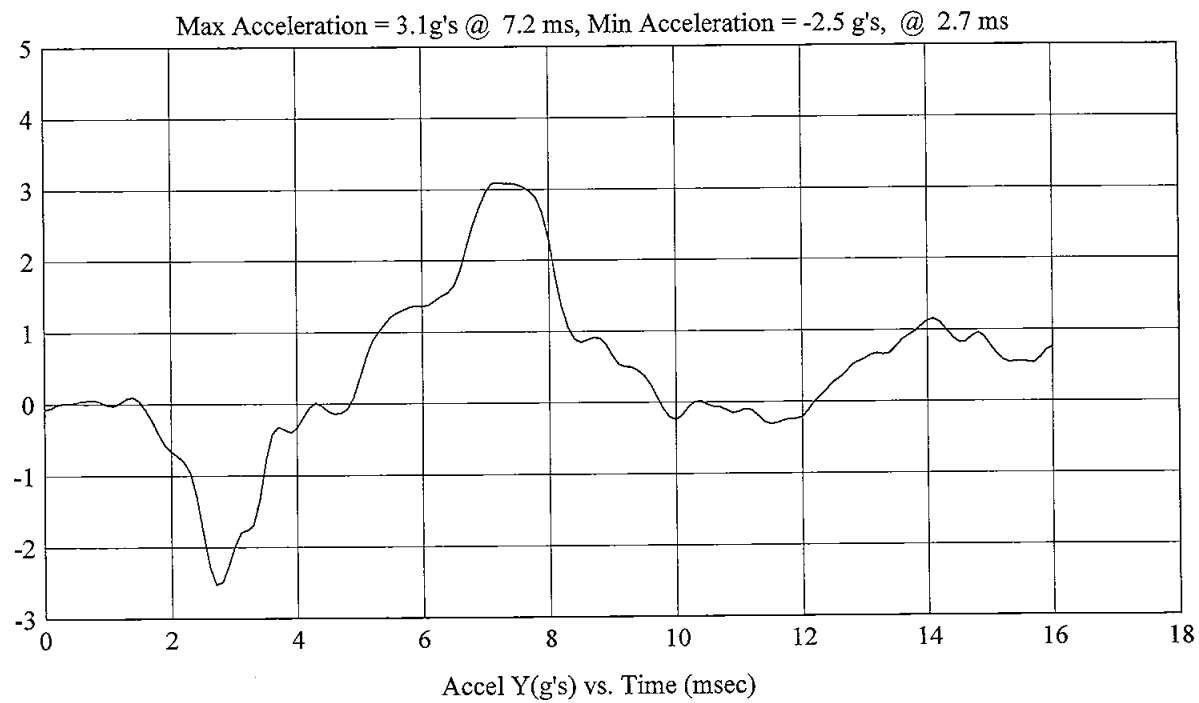
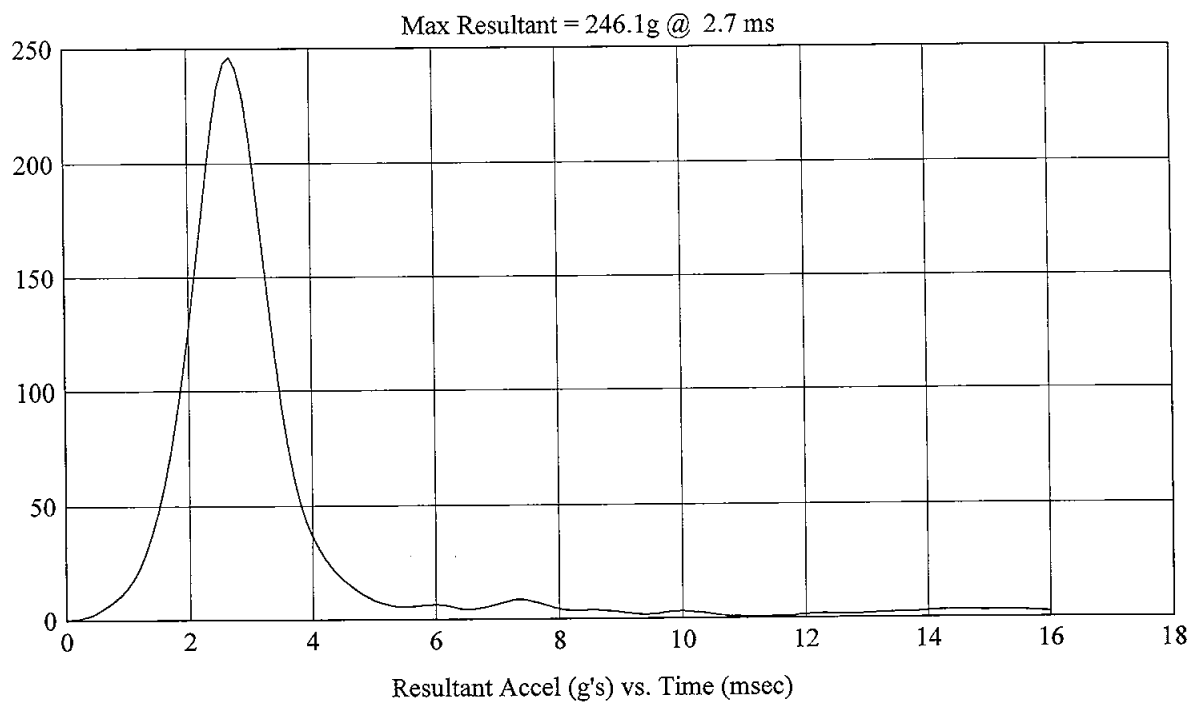
RECORDED BY:  DATE: 07/14/2006APPROVED BY: 

Head Drop
(Preliminary Test Report)

Test Number: H39010
Test Description: Pre

MGA Job Number: G06I7-001.4

Test Date: 07/14/2006
Head #: 039

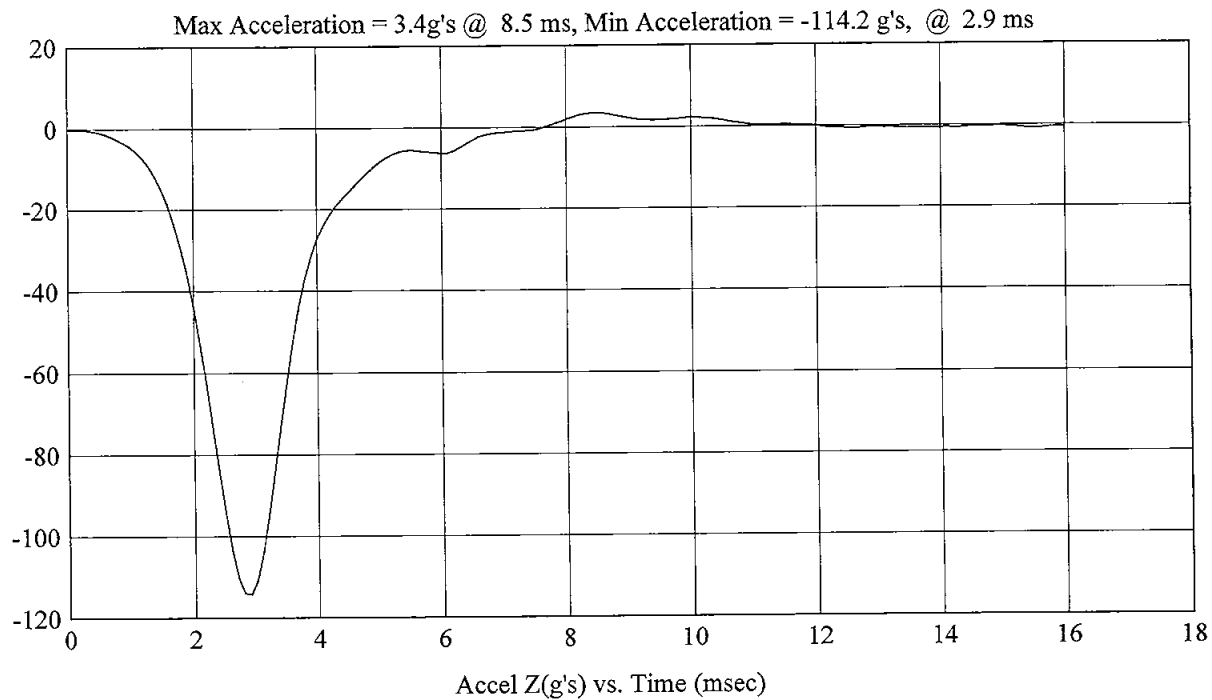
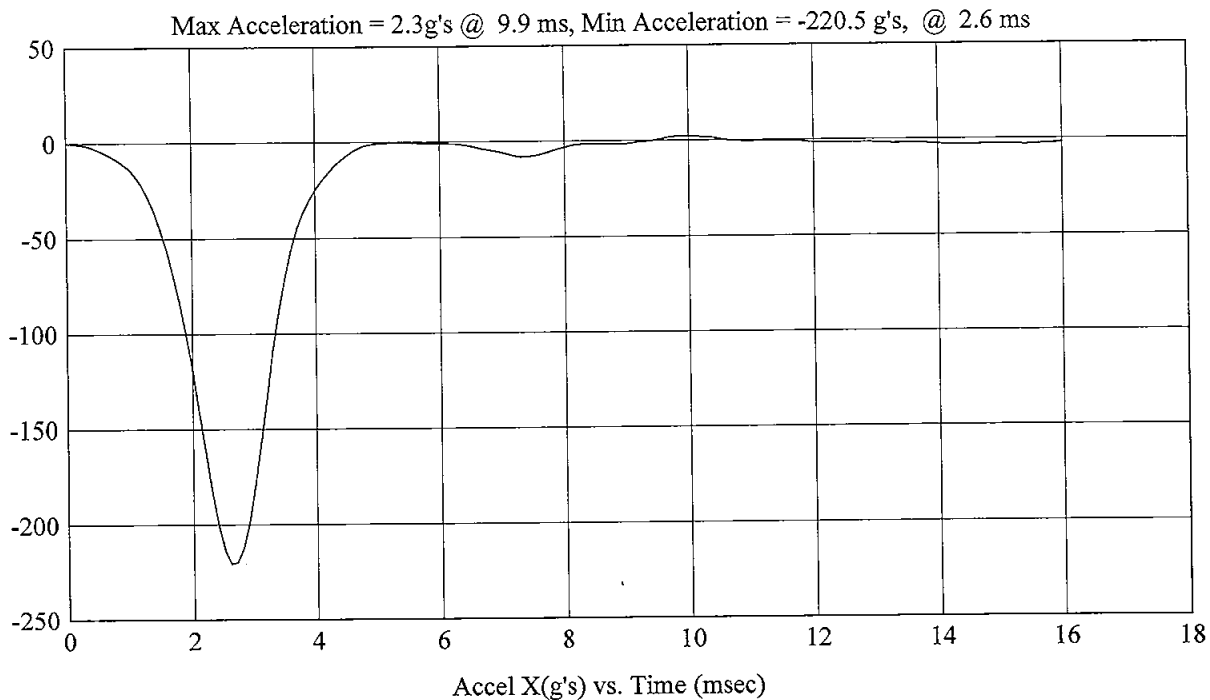


Head Drop
(Preliminary Test Report)

Test Number: H39010
Test Description: Pre

MGA Job Number: G06I7-001.4

Test Date: 07/14/2006
Head #: 039

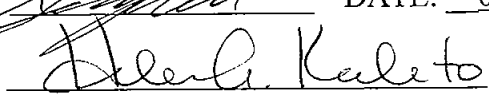


HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: 039		CALIBRATION DATE: 07/26/2006
		CALIBRATION TIME: 4:35:12 PM
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.0
Temperature	19° C to 26° C	25
Relative Humidity	10% to 70%	49
Peak Resultant Acceleration	225 G's to 275 G's	253.3
Peak Lateral Acceleration	15 G's Maximum	7.2
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	J13753	04/07/06	10/07/06
2	ENDEVCO	7264-2000	J22700	04/07/06	10/07/06
3	ENDEVCO	7264-2000	J32734	04/07/06	10/07/06

REMARKS:

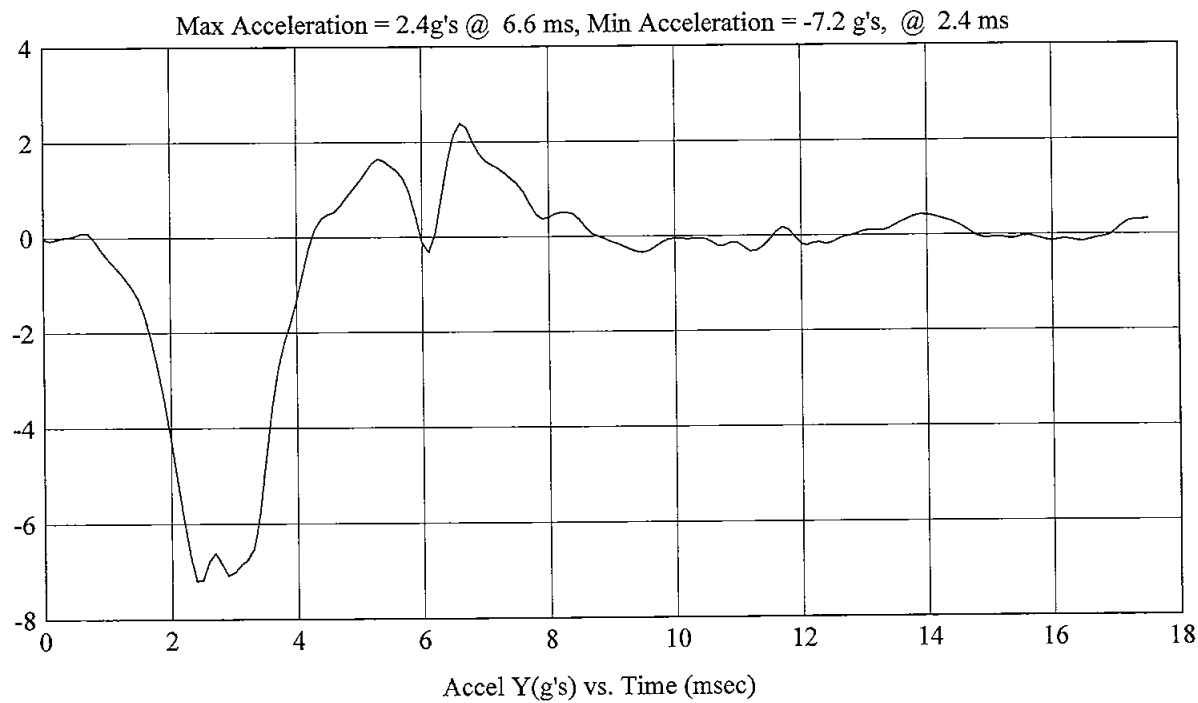
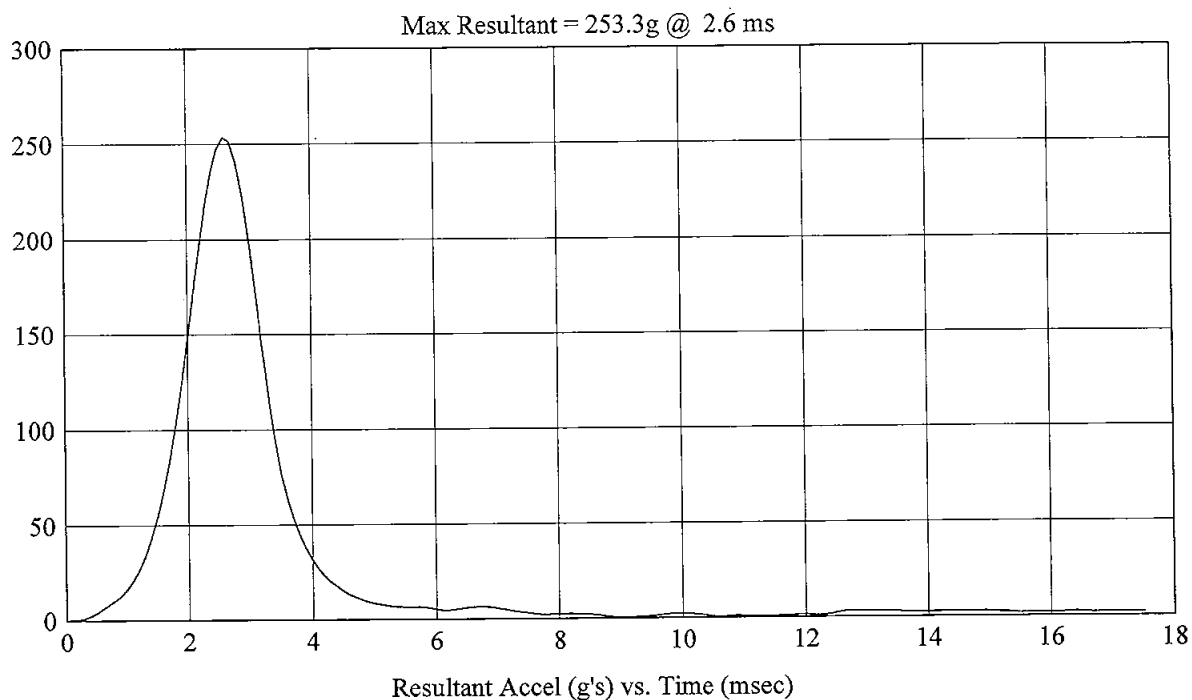
RECORDED BY:  DATE: 07/26/2006APPROVED BY: 

Head Drop
(Preliminary Test Report)

Test Number: H39011
Test Description: Post

MGA Job Number: G06I7-001.4

Test Date: 07/26/2006
Head #: 039

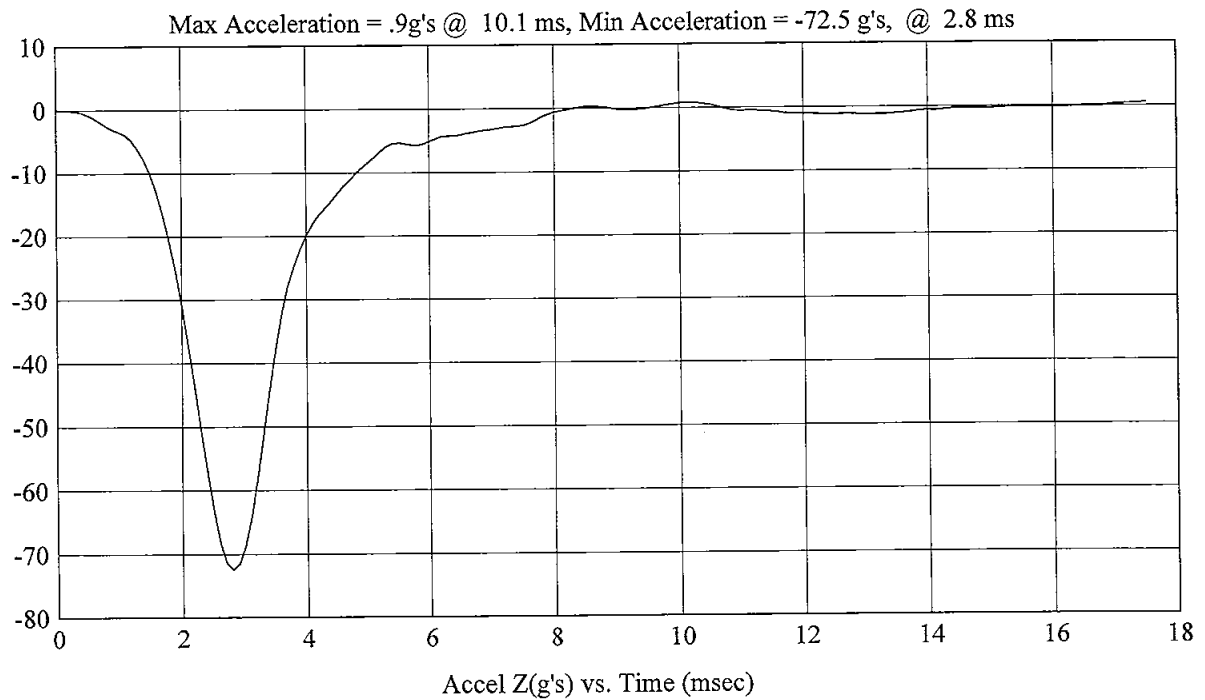
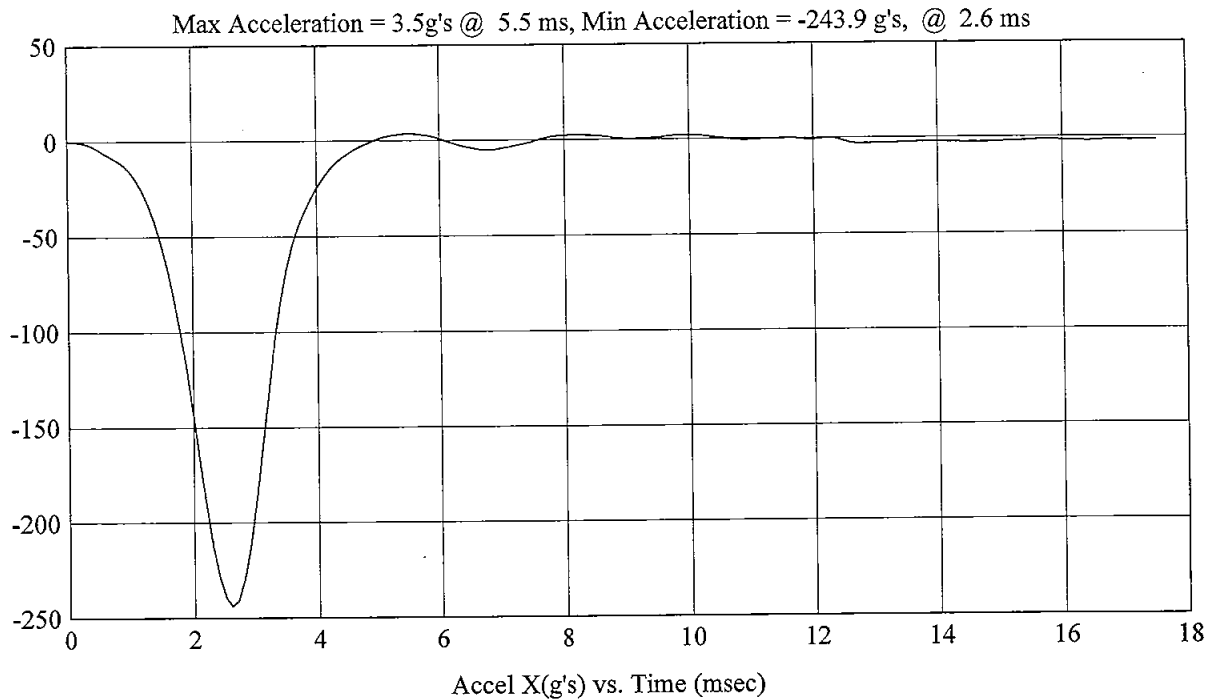


Head Drop
(Preliminary Test Report)

Test Number: H39011
Test Description: Post

MGA Job Number: G06I7-001.4

Test Date: 07/26/2006
Head #: 039





MGA RESEARCH CORP
2006 TOYOTA HIGHLANDER
C65101 **7/17/06**

AS DELIVERED









TIRE AND LOADING INFORMATION

SEATING CAPACITY: TOTAL 5
FRONT 2: REAR 3

The combined weight of occupants and cargo should never exceed 390 kg or 860 lbs.

INFORMATION SUR LES PNEUS ET LE CHARGEMENT

NOMBRE DE PLACES ASSISES: TOTAL 5
AVANT 2: ARRIERE 3

Le poids total des occupants et du chargement ne doit jamais être supérieur à 390 kg ou 860 lb.

TIRE	SIZE	COLD TIRE PRESSURE	PNEUS	DIMENSION	PRISSION DE GONFLAGE A FROID
FRONT	P225/70R16	210kPa, 30PSI	AVANT	P225/70R16	210kPa, 30PSI
REAR	P225/70R16	210kPa, 30PSI	ARRIERE	P225/70R16	210kPa, 30PSI
SPARE	P225/70R16	210kPa, 30PSI	SECOURS	P225/70R16	210kPa, 30PSI

SEE OWNER'S
MANUAL FOR
ADDITIONAL
INFORMATION

POUR DE PLUS
AMPLES INFOR-
MATIONS, VOIR
LE MANUEL DU
PROPRIETAIRES

6 X 4-3202

LE CHARGEMENT

TOTAL 5
 AVANT 2: ARRÈRE 3
 du chargement ne
 1 kg ou 660 lb.

PRESSION DE
 PNEUMATIQUES À FROID

210kPa, 30PSI

210kPa, 30PSI

210kPa, 30PSI

POUR DE PLUS
 AMPOLES INFOR-
 MATIONS, VOIR
 LE MANUEL DU
 PROPRIÉTAIRE

6 X 48202

MFD. BY: TOYOTA MOTOR CORPORATION

GVWR: 2430KG (5360LB)

GAWR: FRT. 1300KG (2865LB) WITH P225/70R16 TIRES.

16X6 1/2JJ RIMS, AT 210KPA (30PSI) COLD.

RR. 1340KG (2950LB) WITH P225/70R16 TIRES.

16X6 1/2JJ RIMS, AT 210KPA (30PSI) COLD.

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR

VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON

THE DATE OF MANUFACTURE SHOWN ABOVE

JTEGD21AX60140034



C/TR: 4R3/FA03

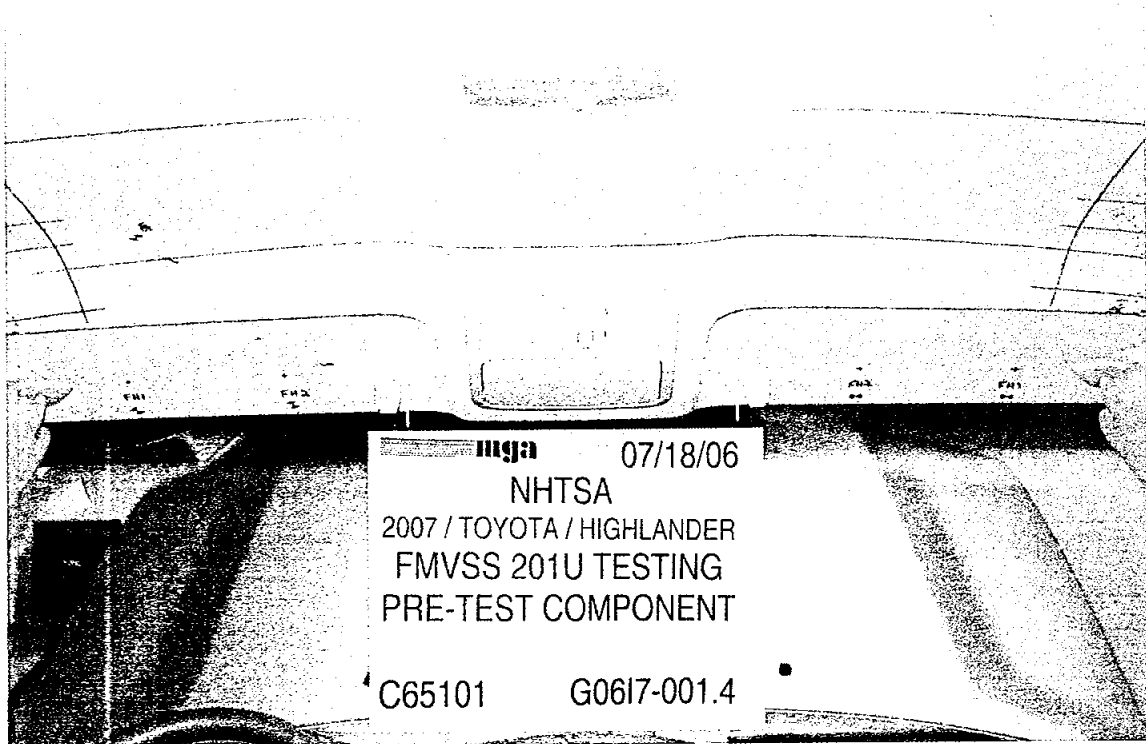
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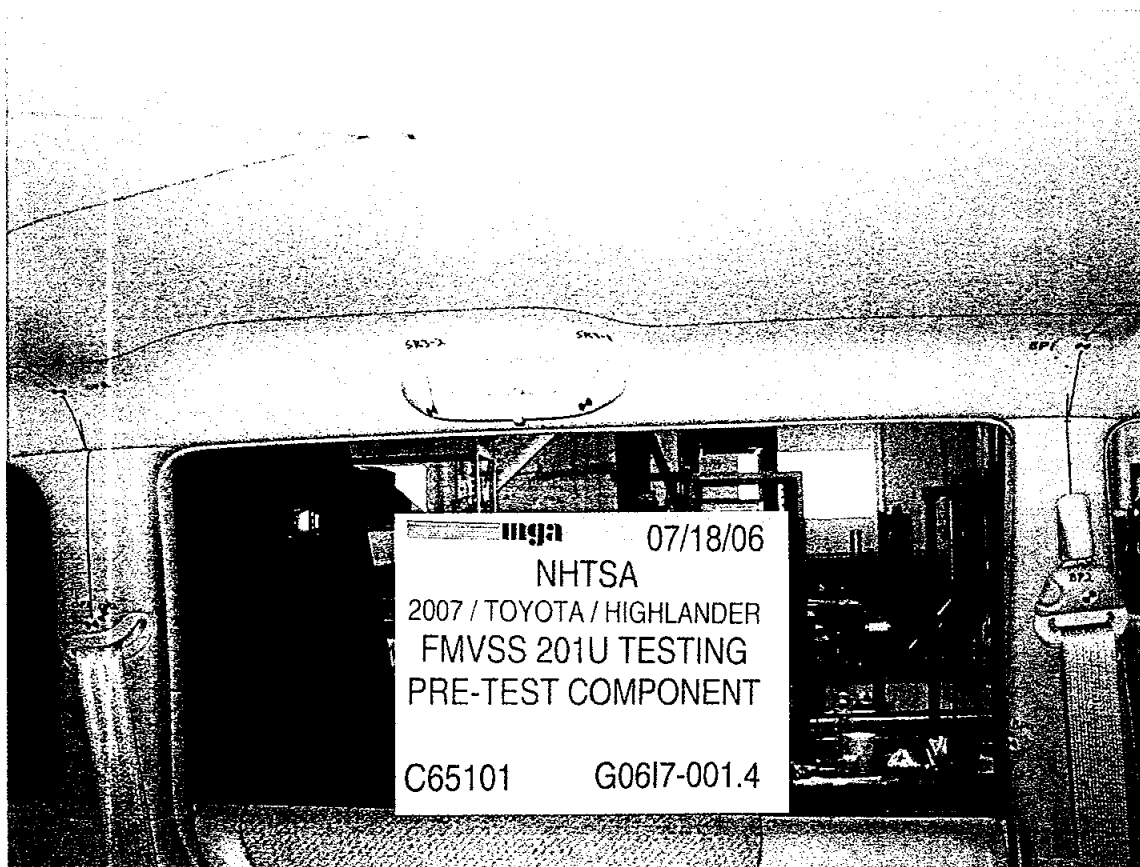
MADE IN JAPAN

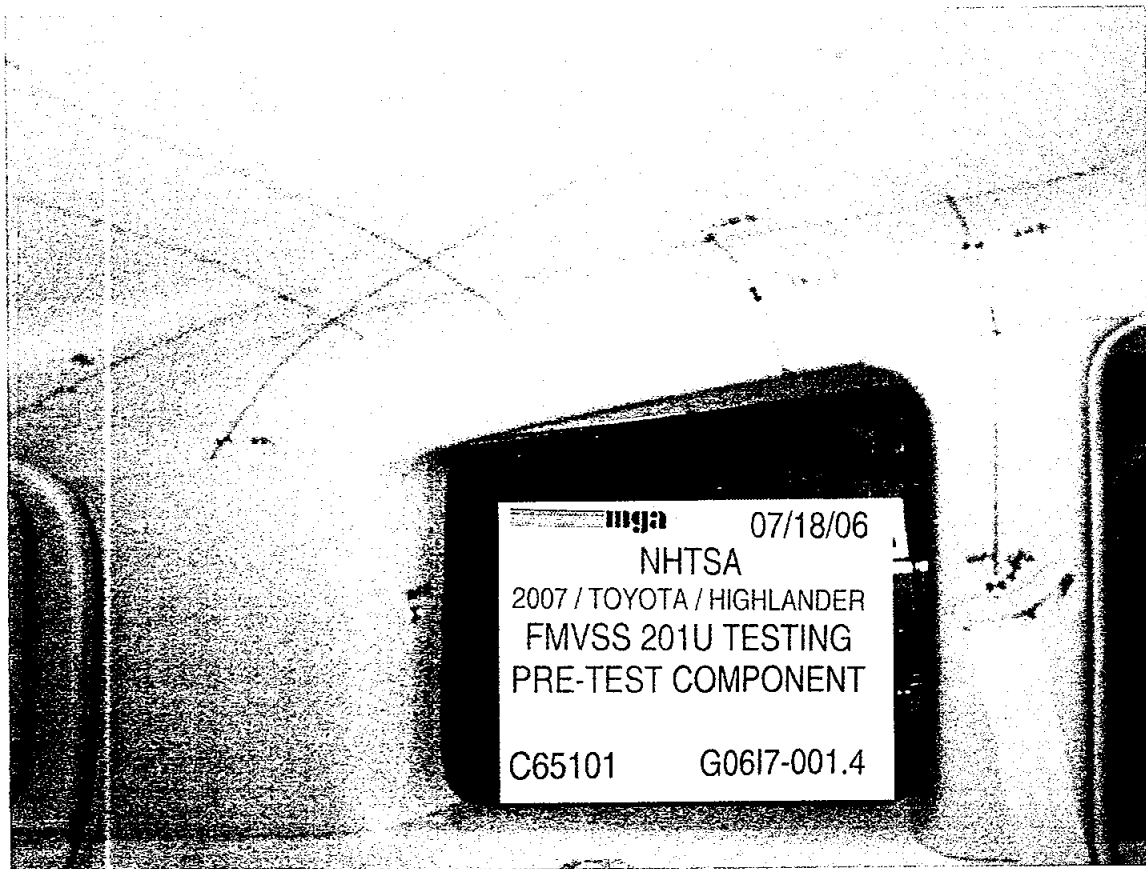
556

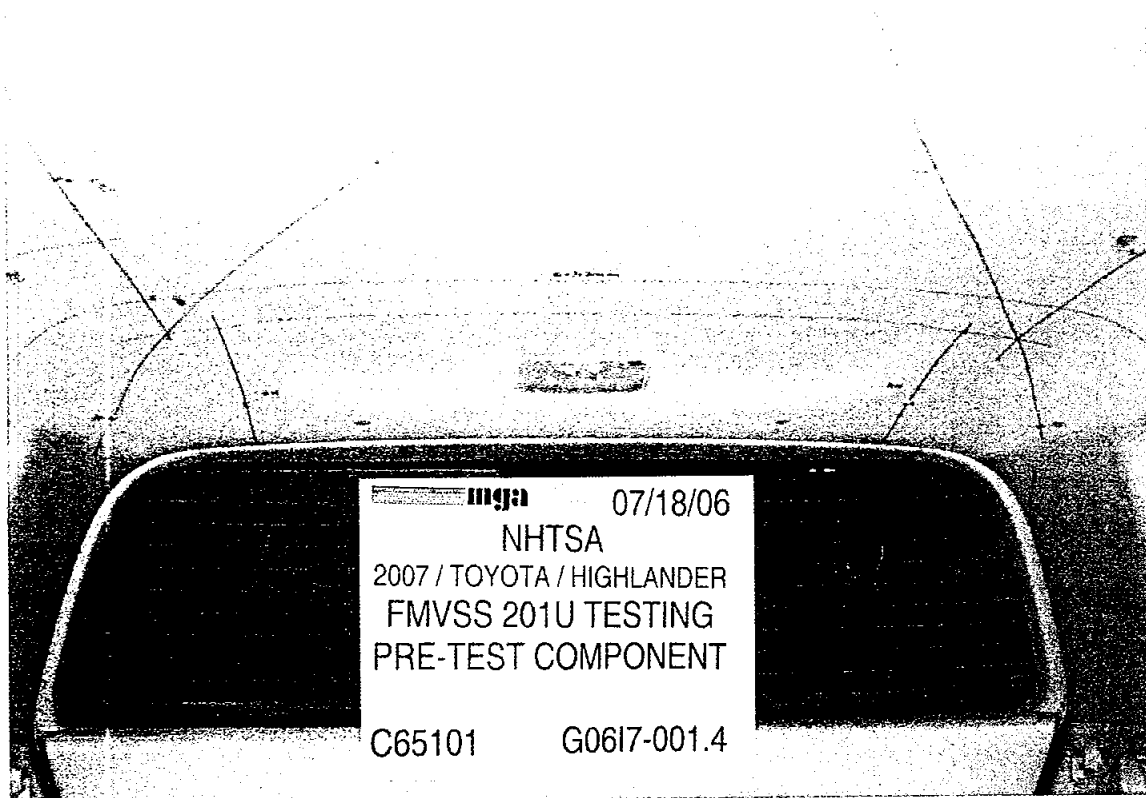
11/05

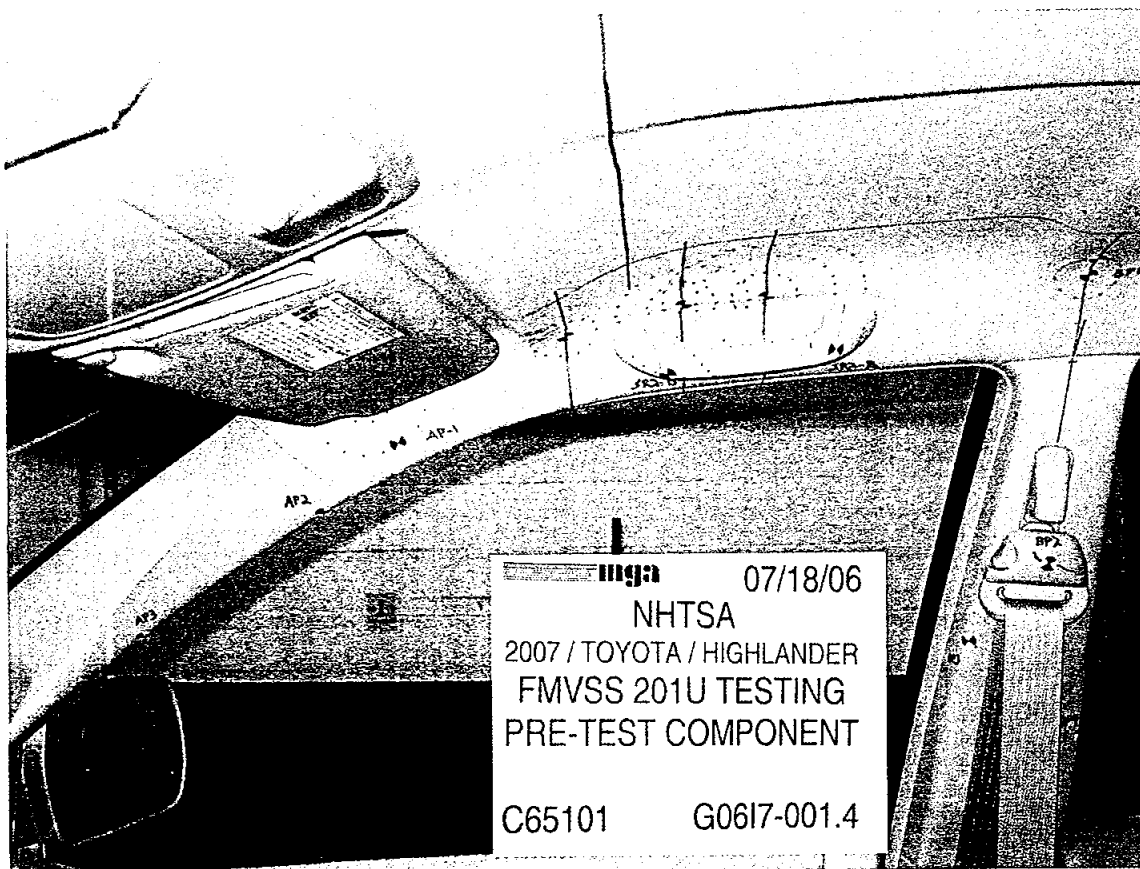


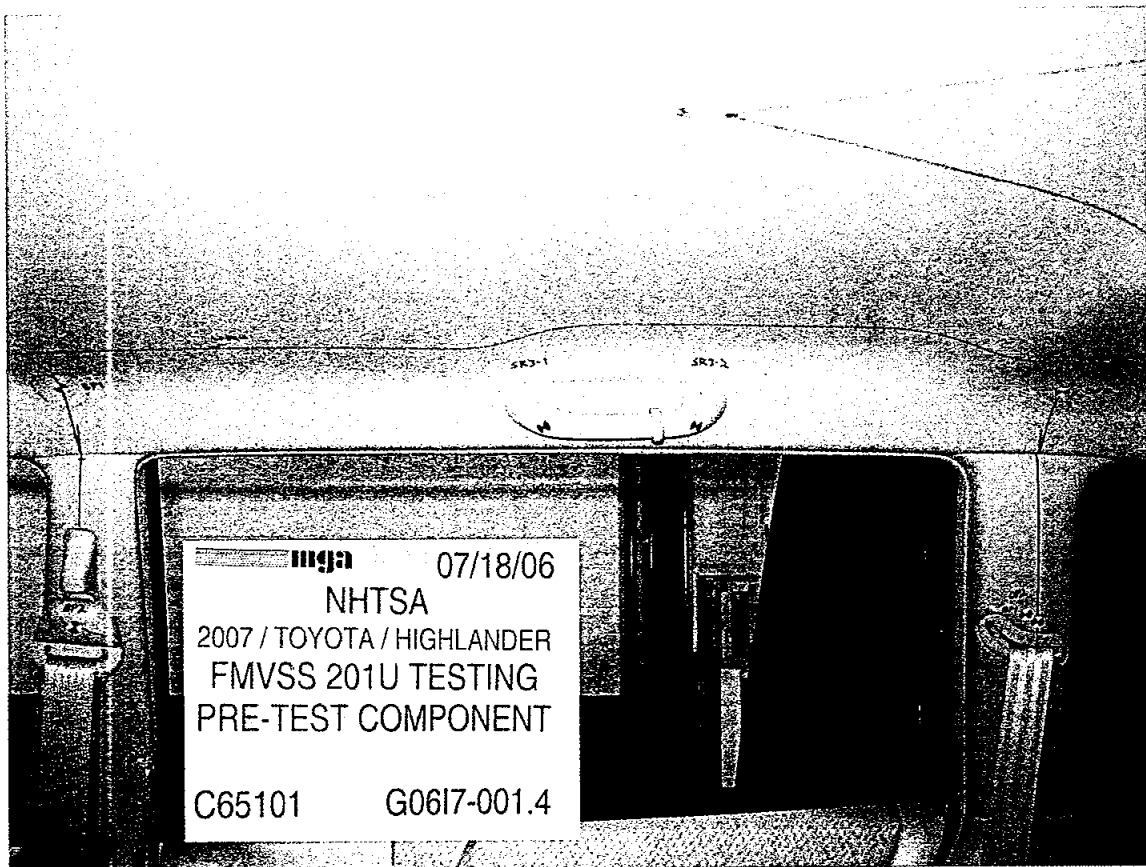








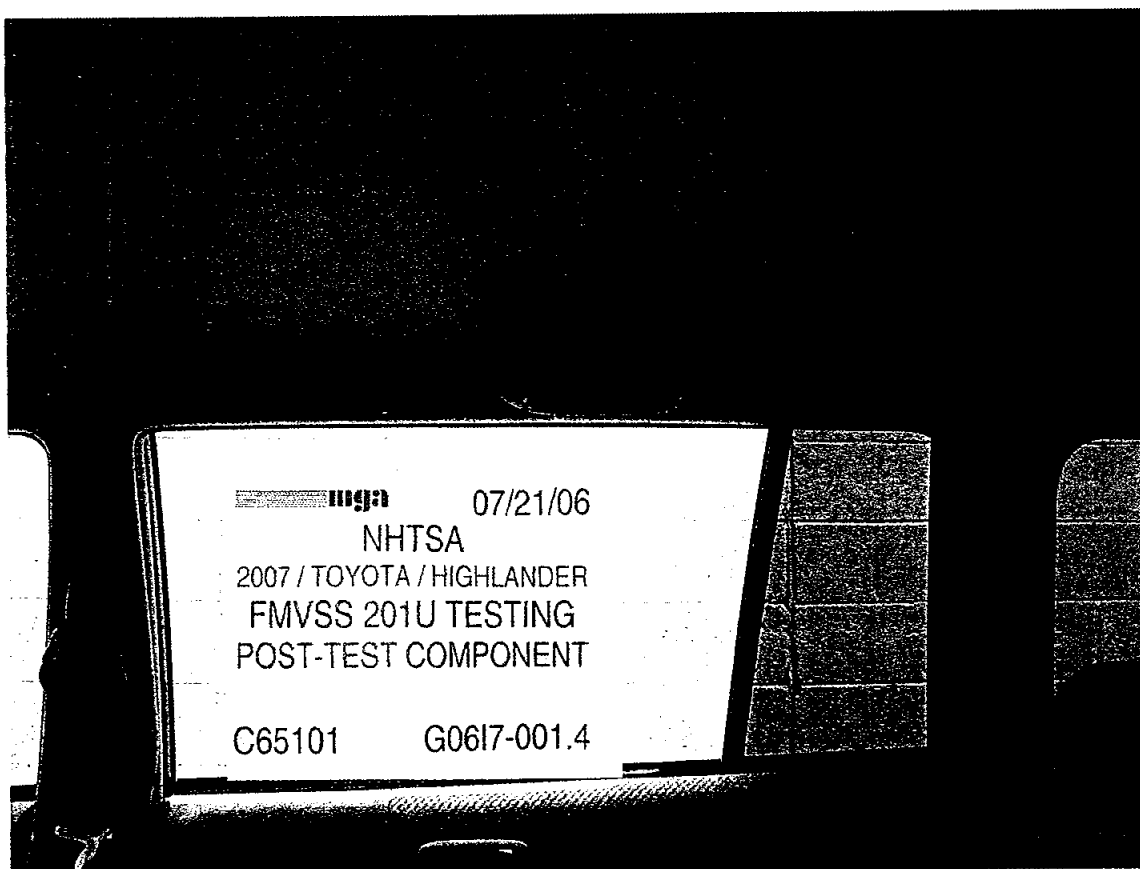


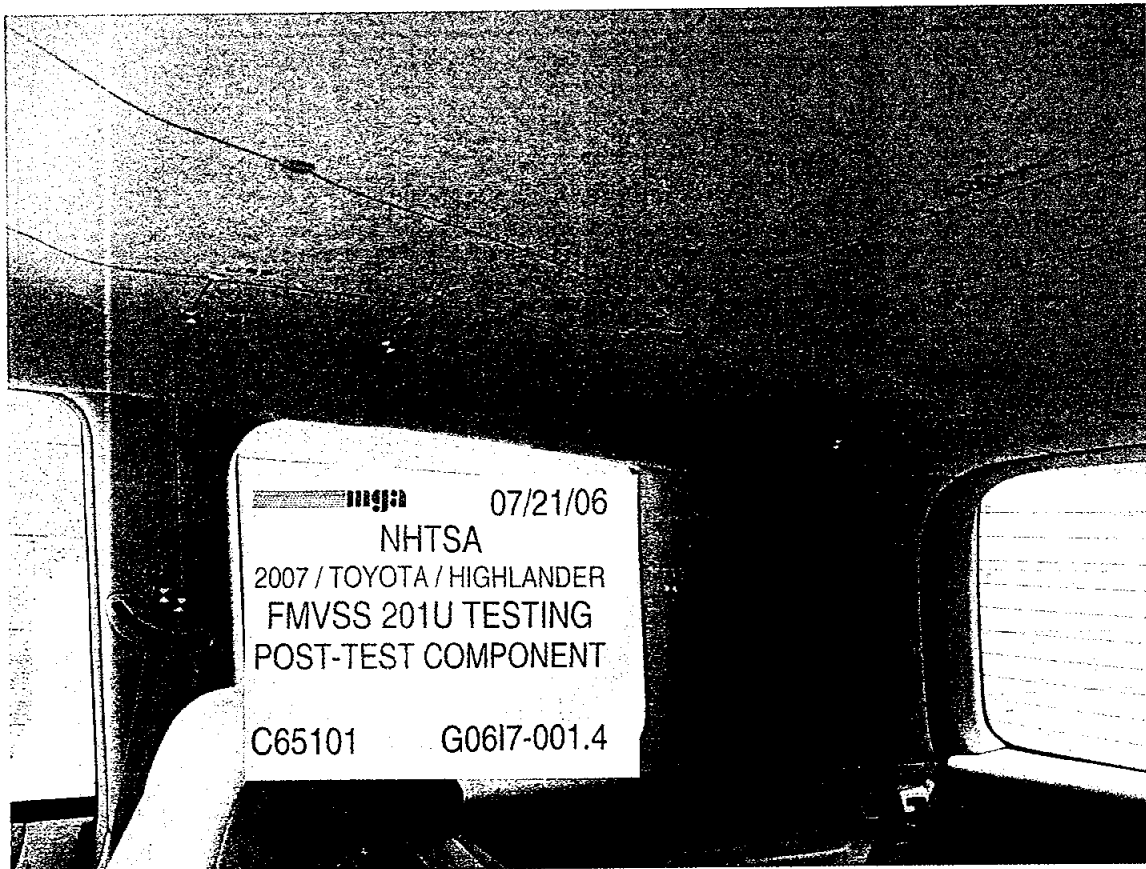


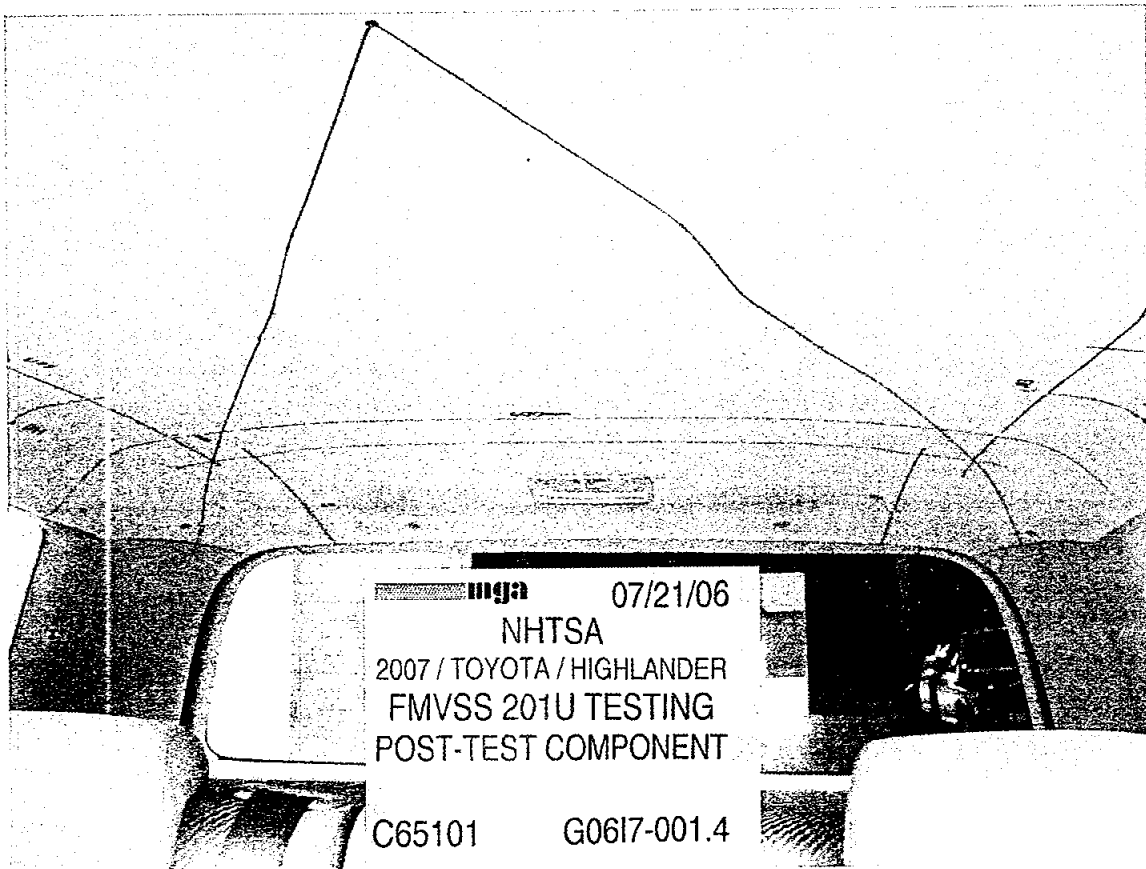




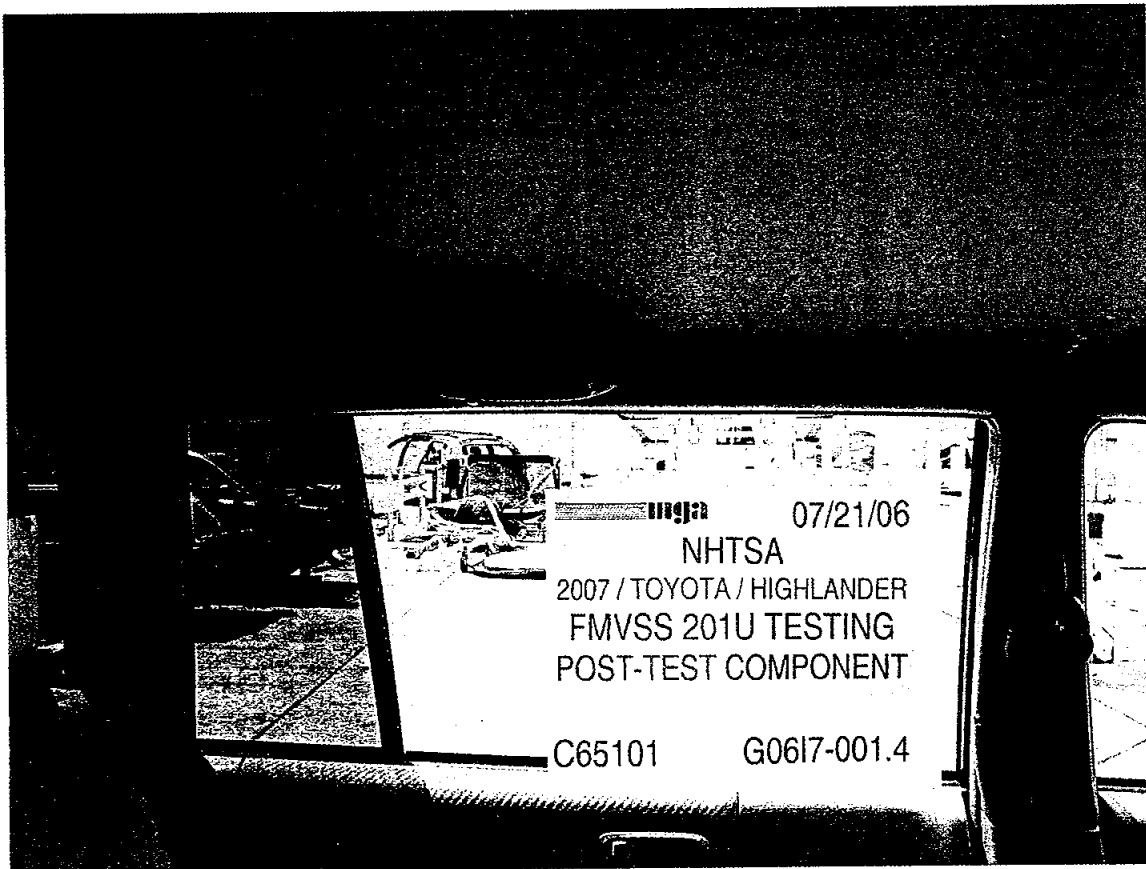


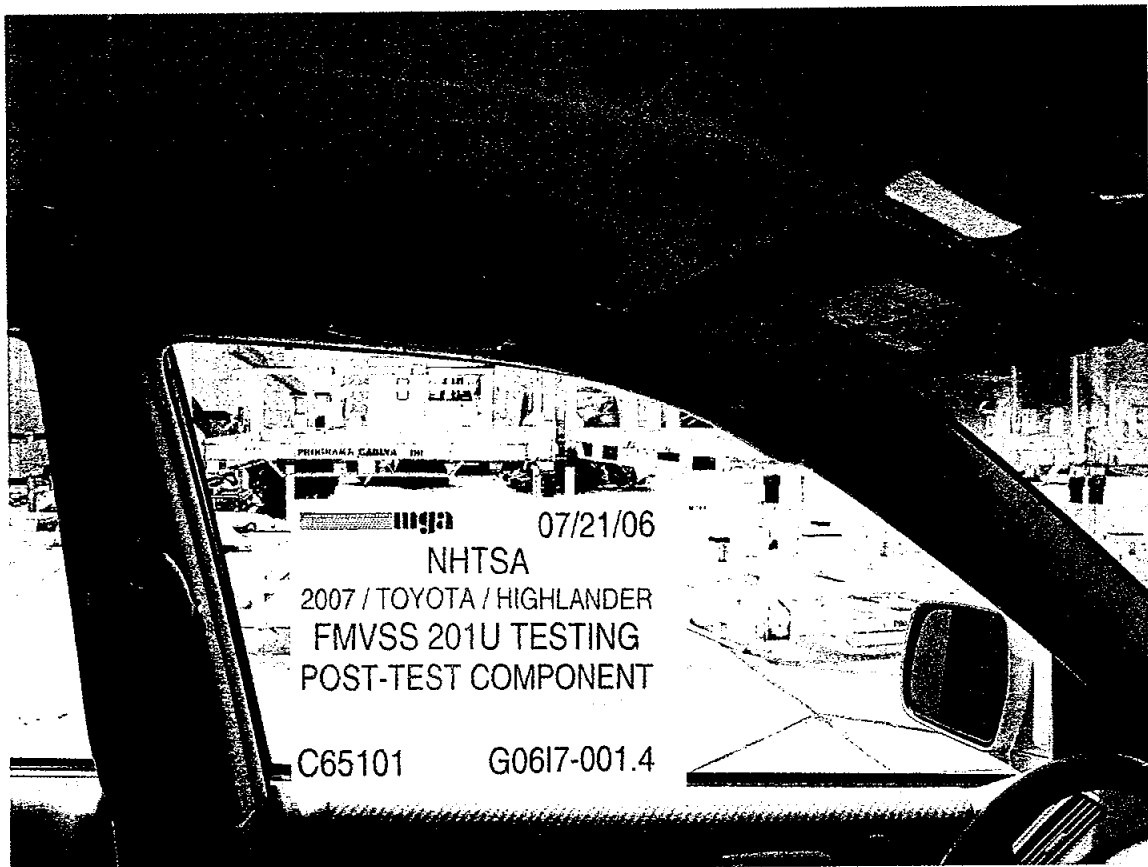




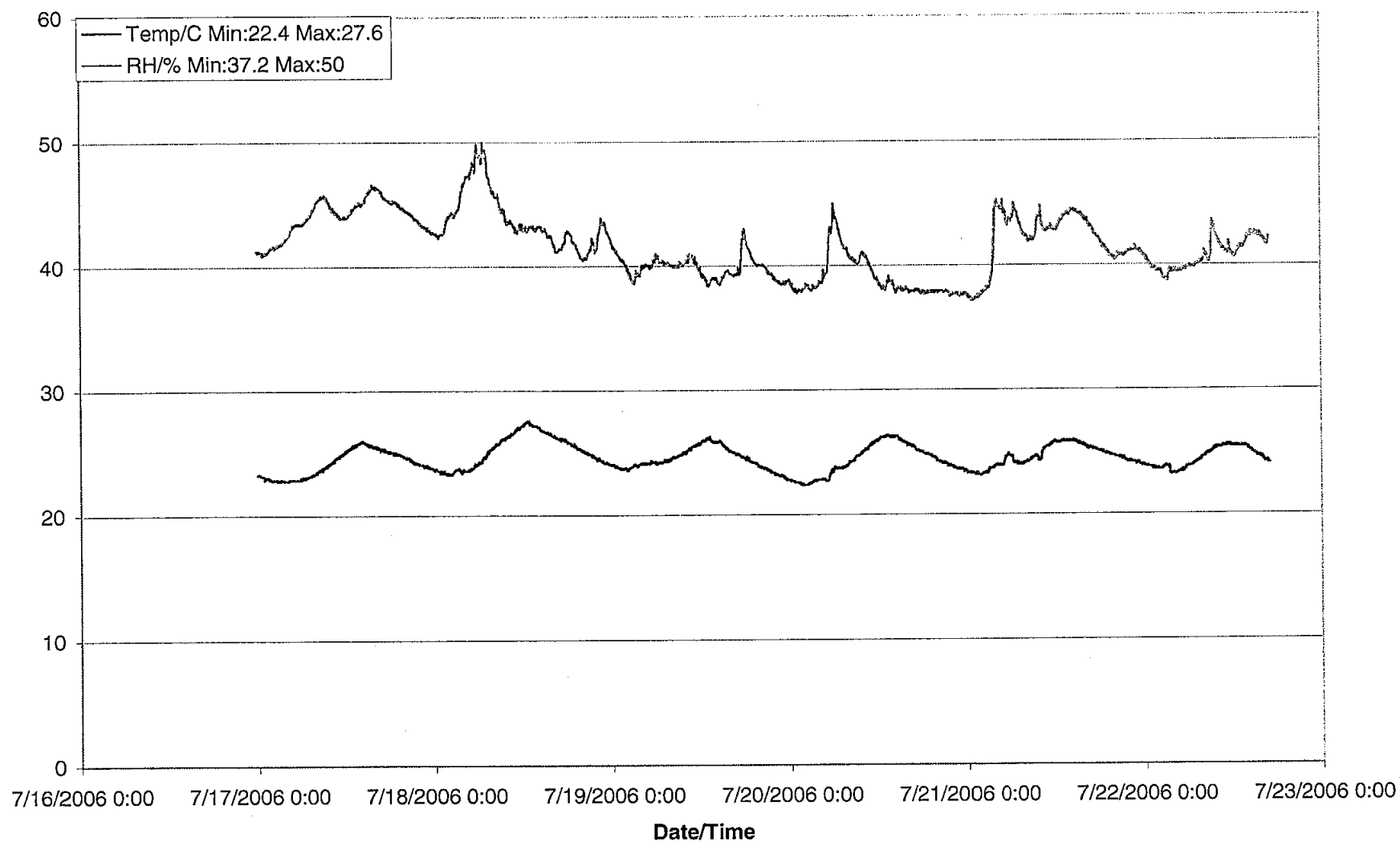








C65101 Toyota Highlander NHTSA 201u
July 17-23 Temperature Trace





mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J35924	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 04/06/2006	Calibration Date: 06/13/2005
	Calibrated By: <i>Chuck DiMaggio/PCB Piezotronics, Inc.</i>

Test Reference Number: A0602

New DLR (100k , Units:G): 91.4

StdDeviation (%) 0.333

% Difference in DLR (New vs. Old): -0.253

Temperature (°F): 74

Humidity (%): 34

Performed By: *Matt Kerr*

Approved By: *Deena A. Kalito*

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 4.1\%$. 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 $k=2$.

**mga research corporation****CALIBRATION CERTIFICATE**

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J35919	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 04/06/2006	Calibration Date: 06/13/2005
	Calibrated By: <i>Chuck DiMaggio/PCB Piezotronics, Inc.</i>

Test Reference Number: A0602**New DLR (100k , Units:G):** 94.4**StdDeviation (%)** 0.447**% Difference in DLR (New vs. Old):** -0.659**Temperature (°F):** 74**Humidity (%):** 34**Performed By:****Approved By:**

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 4.1\%$. 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 $k=2$.

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**mga research corporation****CALIBRATION CERTIFICATE**

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J22664	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 04/06/2006	Calibration Date: 06/13/2005
	Calibrated By: <i>Chuck DiMaggio/PCB Piezotronics, Inc.</i>

Test Reference Number: A0602

New DLR (100k , Units:G): 94.3

StdDeviation (%) 0.379

% Difference in DLR (New vs. Old): 1.167

Temperature (°F): 74

Humidity (%): 34

Performed By:

Matt Kerr

Approved By:

Deena Kalito

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 4.1\%$. 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 $k=2$.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J36197	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 04/07/2006	Calibration Date: 06/13/2005
	Calibrated By: <i>Chuck DiMaggio/PCB Piezotronics, Inc.</i>

Test Reference Number: A0604

New DLR (100k , Units:G): 108.8

StdDeviation (%) 0.008

% Difference in DLR (New vs. Old): -1.418

Temperature (°F): 72

Humidity (%): 38

Performed By:

Matt Kerr

Approved By:

Donald Kalito

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 4.1\%$. 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 $k=2$.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J36193	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 04/07/2006	Calibration Date: 06/13/2005
	Calibrated By: <i>Chuck DiMaggio/PCB Piezotronics, Inc.</i>

Test Reference Number: A0604

New DLR (100k , Units:G): 102.7

StdDeviation (%) 0.015

% Difference in DLR (New vs. Old): -1.848

Temperature (°F): 72

Humidity (%): 38

Performed By:

Matt Kerr

Approved By:

Deen A. Kalito

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 4.1\%$. 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 $k=2$.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J36353	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 04/07/2006	Calibration Date: 06/13/2005
	Calibrated By: <i>Chuck DiMaggio/PCB Piezotronics, Inc.</i>

Test Reference Number: A0604

New DLR (100k , Units:G): 97.2

StdDeviation (%) 0.003

% Difference in DLR (New vs. Old): -0.381

Temperature (°F): 72

Humidity (%): 38

Performed By: *Matt Kerr*

Approved By: *Heend. Kalito*

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 4.1\%$. 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 $k=2$.



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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J13753	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 04/07/2006	Calibration Date: 06/13/2005
	Calibrated By: <i>Chuck DiMaggio/PCB Piezotronics, Inc.</i>

Test Reference Number: A0603

New DLR (100k , Units:G): 103.6

StdDeviation (%) 0.411

% Difference in DLR (New vs. Old): .013

Temperature (°F): 72

Humidity (%): 38

Performed By:

Matt Kerr

Approved By:

Heleen A. Kalito

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 4.1\%$. 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 $k=2$.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J22700	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 04/07/2006	Calibration Date: 06/13/2005
	Calibrated By: <i>Chuck DiMaggio/PCB Piezotronics, Inc.</i>

Test Reference Number: A0603

New DLR (100k , Units:G): 94.4

StdDeviation (%) 0.342

% Difference in DLR (New vs. Old): -1.008

Temperature (°F): 72

Humidity (%): 38

Performed By:

Matt Kerr

Approved By:

Heena Kalita

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 4.1\%$. 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 $k=2$.

446 executive drive • troy, mi 48083

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www.mgaresearch.com



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J32734	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 04/07/2006	Calibration Date: 06/13/2005
	Calibrated By: <i>Chuck DiMaggio/PCB Piezotronics, Inc.</i>

Test Reference Number: A0603

New DLR (100k , Units:G): 95.5

StdDeviation (%) 0.25

% Difference in DLR (New vs. Old): 1.345

Temperature (°F): 72

Humidity (%): 38

Performed By:

Matt Kerr

Approved By:

Debra A. Kalito

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 4.1\%$. 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 $k=2$.

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Interim Certification Document

Part Description: Silver Certification Date: 06/15/06 Serial#: S08-05-98-01273
Single Point 2 Sigma: S08-05 +/-0.076mm (+/-0.0030") Certificate#: S0127338883
Linear Displacement 2 Sigma: S08-05 +/-1.108mm (+/-0.042") Ambient Temperature: 22°C +/- 3°C

Measurement Standards Traceability

Bali Bar Kit	Asset Number: 606	Calibration Date: 05/25/06	*SI Traceability: NPL-LL0101/0501
10mm Step Gauge, Mitutoyo	Asset Number: 773	Calibration Date: 04/03/06	*SI Traceability: NIST-821/267216-02
Code No.: 515-744		Calibration Date: 04/03/06	*SI Traceability: UKAS-174978
Measuring range: 1.5m			

*The artifact above has been calibrated with a device traceable to the International System of Units (SI) through a National Metrological Institute (NMI) or through an ISO 17025 Accredited Laboratory. Expanded measurement uncertainty is 3 S + 5.9X micrometers, where X=measured value in meters. Uncertainty is expressed at approximately the 95% Level of Confidence using k=2.00.

Certification Results

A basic four quadrant certification included with all FARO Arms and comprised of: 2 vertical level single point repeatability test in 4 quadrants with 5 repeats from 4 directions	PASSED
Step Gauge Test in 4 quadrants, 3 orientations per quadrant	PASSED
3 Length, 3 position free ball bar test in 4 quadrants	PASSED

Calibration and certification conforms to procedures developed in accordance with ASME B89.4.22-200X.

Instrument condition as received

Inoperative

Instrument condition outgoing

Within specifications

Technician: Harry Van Horn Date: 6/15/06

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

FARO Technologies, Inc.
PH1:1-800-736-2771
PH2:407-333-9911
FAX:407-333-8056

125 Technology Park
Lake Mary, FL 32746
USA

FARO



LABORATORY
ACCREDITATION
BUREAU
ISO/IEC 17025 Accredited

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

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

Tape Measure Calibration Certificate

Reference Steel Rule

Brand: GEI SYRACUSE
S/N: M6A00067
Calibration Date: 8-30-06

Subject Tape Measure

Brand: SABLEY
S/N: 675
Calibration Date: 4-25-06

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 $\pm 1/32$ of an inch (1 mm), then the tape measure is acceptable.

Pass X Fail Maximum Difference = 0

Date: 4-25-06

Performed By: RF Mill

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 0.2\%$.
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 $k=2$.

5/1/06



4700 Barden Court S.E. • Kentwood, MI 49512 • Telephone: 616.698.3124 • Fax: 616.698.2364

Certificate of Calibration

MGA Research
446 Executive Drive
Troy, MI 48063

Order Number: 45982
Report Number: 050829307
Page: 1 of 1

Gauge Number: MGA00048
Gauge Desc: Digital Protractor
Manufacturer: N/A
Model Number: Pro 380
Serial Number: N/A

Customer PO: 07-05-0820
Last Calibration: 8/23/04
Calibration Date: 8/29/05
Next Calibration: 8/29/06

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 Proc. No. 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.

Calibration Procedure
Uncertainty Expressed at
95% confidence (K=2)
(0.8R + 2L) microinches

Standard Used
Gage BIK Set ID# 105
DoAll Sine Bar ID# 1879

Cal Date
6/6/05
12/8/04

Due Date
6/6/06
12/6/05

Traceable No.
821/270003-04
821/270003-04 & 3800042619

Results:

Units	As Found Readings		
	Nominal	Actual	Deviation
Decimal Deg.	5.00	5.0	0.00
	10.00	10.1	0.10
	20.00	20.1	0.10
	30.00	30.1	0.10
	40.00	40.1	0.10

Reference Level Check: Within +/- .1 degrees

Nominal	As Left Readings	
	Actual	Deviation
5.00	5.0	0.00
10.00	10.1	0.10
20.00	20.1	0.10
30.00	30.1	0.10
40.00	40.1	0.10

Reference Level Check: Within +/- .1 degrees

Comments: Environmental conditions during calibration: 68 deg. F., 41 % RH.

Jamie Nikolich
Jamie Nikolich
Calibration Technician

Issued: 8/29/05

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

94 8/31/05

Form: F410/12-3 Revision Date 03-11-03
 Revision Level: E
 STANDARD FORM

20950 Boening St.
 Southfield MI 48075
 Phone (248) 358-0590 Fax (248) 355-2529

Sterling Scale Company Inc. Scale Certificate of Calibration

Customer: MGA RESEARCH
 Location of Calibration: 446 EXECUTIVE DRIVE
TROY, MI 48063
 Certification Number: 9436
 Date of Calibration: 7-20-06
 **Next Calibration Due: 7-07
 Environmental Condition: Good Fair Poor

Make:	Model:	Serial/ID#:	Capacity:
SW SCALES	SW DELUXE	26032389	8800 x 11b

This certifies that the above scale has been calibrated using the relevant EPO, original equipment manufacturer calibration procedures along with Handbook 44 tolerances using weights traceable to the National Institute of Standards and Technology as well as the International Systems of Units (SI).

Sterling Scale Weight/Weight kit serial #: 1216, 1218, 1224, 1221, 50967, 10002

Calibrated to class: III

Date Weight/Weight kit calibrated: 4/06 9/05

Date Weight/Weight kit due: 4/08 9/07

Expanded Uncertainty ($k=2$) confidence level of 95% is reported with the before and after readings on next page.

Temperature 78 Humidity 66

Pg 1 of 3

These items relate only to these results

Tolerances followed are maintenance/acceptance per HB-44

This report shall not be reproduced, except in full, without written approval of the laboratory.

** Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.

The reported uncertainty is valid only for the environment in which it is determined.



1448.01

7/20/06

Form: F410/12-3 Revision Date 03-11-03
 Revision Level: E
 STANDARD FORM

20950 Boening St.
 Southfield Mi.48075
 Phone (248) 358-0590 Fax (248) 358-0590

Sterling Scale Company Inc.
Scale Certificate of Calibration

Applied Test Weight	Before Adjustment	Tolerance +/-	in tolerance Y / N	After Adjustment	in tolerance Y / N	expanded uncertainty
RF1) 50 ^{lb}	50 ^{lb}	1 ^{lb}	✓	50 ^{lb}	✓	.003 ^{lb}
1000 ^{lb}	1000 ^{lb}	2 ^{lb}	✓	1000 ^{lb}	✓	.06 ^{lb}
2200 ^{lb}	2200 ^{lb}	2 ^{lb}	✓	2200 ^{lb}	✓	.13 ^{lb}
RF2) 50 ^{lb}	50 ^{lb}	1 ^{lb}	✓	50 ^{lb}	✓	.003 ^{lb}
1000 ^{lb}	1000 ^{lb}	2 ^{lb}	✓	1000 ^{lb}	✓	.06 ^{lb}
2200 ^{lb}	2200 ^{lb}	2 ^{lb}	✓	2200 ^{lb}	✓	.13 ^{lb}

Shift test.

1	2	3	4
---	---	---	---

4 PAD SYSTEM

	1	2	3	4
Before Adj.				
After Adj.				

Scale condition as found: GOOD

Tests performed: ☒ Repeatability ☒ Linearity ☐ Sensitivity ☒ Discrimination

☒ Scale Certified

☐ Scale Rejected

If scale is rejected, why?

GARY
 Sterling Scale Service Rep.

Date: 7-20-06

pg 2 of 3

These items relate only to these results.

This report shall not be reproduced, except in full, without written approval of the laboratory.

Tolerances followed are maintenance/acceptance per HB-44

** Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.



1448.01

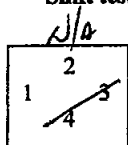
Form: F410/12-3 Revision Date 03-11-03
 Revision Level: E
 STANDARD FORM

20950 Boening St.
 Southfield Mi.48075
 Phone (248) 358-0590 Fax (248) 358-0590

Sterling Scale Company Inc.
Scale Certificate of Calibration

Applied Test Weight	Before Adjustment	Tolerance +/-	in tolerance Y / N	After Adjustment	in tolerance Y / N	expanded uncertainty
LR3) 50 ^{lb}	50 ^{lb}	1 ^{lb}	Y	50 ^{lb}	Y	.003 ^{lb}
1000 ^{lb}	1000 ^{lb}	2 ^{lb}	Y	1000 ^{lb}	Y	.06 ^{lb}
2200 ^{lb}	2200 ^{lb}	2 ^{lb}	Y	2200 ^{lb}	Y	.13 ^{lb}
LF4) 50 ^{lb}	50 ^{lb}	1 ^{lb}	Y	50 ^{lb}	Y	.003 ^{lb}
1000 ^{lb}	1000 ^{lb}	2 ^{lb}	Y	1000 ^{lb}	Y	.06 ^{lb}
2200 ^{lb}	2200 ^{lb}	2 ^{lb}	Y	2200 ^{lb}	Y	.13 ^{lb}

Shift test.



4 PAD SYSTEM

	1	2	3	4
Before Adj.				
After Adj.				

Scale condition as found:

GOOD

Tests performed: ☒ Repeatability ☒ Linearity ☐ Sensitivity ☒ Discrimination

☒ Scale Certified

☐ Scale Rejected

If scale is rejected, why?

GARY
 Sterling Scale Service Rep.

Date: 7-26-06

pg 3 of 3

These items relate only to these results.

This report shall not be reproduced, except in full, without written approval of the laboratory.
 Tolerances followed are maintenance/acceptance per HB-44

** Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.



1448.01

Certificate Number: 20053372Cal



Detroit Testing Laboratory, Inc.



Certificate No. 35 85

7111 E. 11 Mile Road, Warren, MI 48090-2729 • (586) 754-6000 • FAX (586) 754-6045 • www.dtl-lab.com

Certificate of Calibration

Equipment Information

Customer:	MGA Research Corporation 446 Executive Drive Troy, MI 48063	Model:	EP4102C
		Serial Number:	12641125353320P
		Manufacturer:	Ohaus
		Description:	Balance
System ID:	MGA00133	DTL Job No.:	5106038
Customer Asset:		Cust PO No.:	7-05-1197

Calibration Information

Calibration Date:	11/9/2005	Procedure:	33K6-4-72-1/98
Due Date:	11/9/2006	Tolerance:	MFR SPEC
Calibration Interval:	12 Month	Temperature:	24 °C
Condition Received:	Pass	Humidity:	43 % RH
Condition Returned:	Pass		
Calibration Limitation:			
Performed On Site:	Yes		

The uncertainty of measurement pertaining to these measurements is estimated to be 6mg + 0.01% Ind based upon an approximate 95 % confidence level at k = 2.

Pass/Fail statements represented are based on data from measurements documented at the time they were made, procedure utilized, professional experience, and associated uncertainty. It is ultimately up to the user of this equipment to determine if this item meets their specific requirements for accuracy for its intended application.

Any calibration interval and due date, if stated, is at the request of the customer. Due to the fact that many variables may effect drift or shift in reported values over time there is no assurance implied that this item will maintain specified accuracies throughout timeframe stated.

Calibration Standards Used Information

Standard Name	System ID	Due Date	Last Action Date
09913, Weight Set, Denver 5kg - 1kg Cla	09913	08/29/2006	08/29/2004
04970, Weight Set, 500g-1mg	04970	02/29/2006	02/08/2006
11197, Temp/RH Indicator Exttech 446580	11197	02/15/2006	02/15/2005

This calibration has been performed and reported in accordance with ISO 17025:2005. Reported results are from standards traceable to N.I.S.T. or another NMI to the International System of Units (SI), derived from physical constants, radio measurements, national measurements standards, or comparison to consensus standards. Value reported apply only to equipment listed. This certificate may not be reproduced, except in its entirety, without written approval of Detroit Testing Laboratory, Inc. Detroit Testing Laboratory Terms and Conditions apply.

Signature: Jerry Wells Date: 2-20-06
Jerry Wells, Technician

Approved: Paul Williams Date: 2-20-06

Date/Time Printed: 2/28/2006

Page 1 of 2

Printed By: QCF 1048-1 Rev 12/31/05

JH 2/20/06

Detroit Testing Laboratory, Inc.

CALIBRATION DATA SHEET

Date: 11/9/05
 DTL I.D: MGA00193
 Cert. No. 20053372Cal

Cal Point grams std	Reading as Found grams wt	Reading as Left grams wt	Deviation as Found grams	Deviation as Left grams	% of Allowable Dev as Found	% of Allowable Dev as Left
0.100	0.10	0.10	0.00	0.00	0.0	0.0
1.000	1.00	1.00	0.00	0.00	0.0	0.0
100.000	100.00	100.00	0.00	0.00	0.0	0.0
1000.00	1000.00	1000.00	0.00	0.00	0.0	0.0
2000.00	2000.01	2000.01	0.01	0.01	33.3	33.3
3000.00	3000.01	3000.01	0.01	0.01	33.3	33.3
4000.00	4000.01	4000.01	0.01	0.01	33.3	33.3



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Certificate of Calibration

MGA Research
446 Executive Drive
Troy, MI 48083

Gauge Number: MGA00146
Gauge Desc: Digital Temperature - Humidity Gage
Manufacturer: Dickson
Model Number: TM326
Serial Number: 0406553

Order Number: 47706
Report Number: 060118708
Page: 1 of 1

Customer PO: N/A
Last Calibration: 1/14/05
Calibration Date: 1/18/06
Next Calibration: 1/18/07

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 natural physical constants (Lithium Chloride and Sodium Chloride for humidity). Calibration was performed in accordance with MetroCal procedure # CP048 and complies with the 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
Vaisala Temperature and Humidity Meter ID#13337

Cal. Date
9/29/05

Due Date
9/29/06

Traceable No.
Cert. No. 4677494-90-1-1

Calibration Procedure
Uncertainty expressed at
95% confidence. (K=2)
Temp. $\pm 0.75^\circ\text{F}$.
Humidity $\pm 2.3\%$ R.H.

Results:

Temperature

As Left Readings

	As Found Results			Standard		
<u>Tolerance</u>	<u>Standard</u>	<u>Actual</u>	<u>Error</u>	<u>Standard</u>	<u>Actual</u>	<u>Error</u>
Temp: $\pm 1.8^{\circ}\text{F}$	68.2	68.4	0.2	35.0	35.0	0.0
Hum: $\pm 5\% \text{ RH}$	72.6	72.8	0.2	68.0	69.0	1.0

Temp. Units
°F.

Percent of Relative Humidity

As Left Readings

<u>Standard</u>	<u>Actual</u>	<u>Error</u>	<u>Standard</u>	<u>Actual</u>	<u>Error</u>
11.3	15.9	4.6	11.3	15.9	4.6
33.7	37.6	3.9	33.7	37.6	3.9
73.0	73.8	0.8	73.0	73.8	0.8

Comments: Environmental Conditions During Test: 68° F, 42% RH
No adjustments required. Tolerance supplied by customer.

Bill Rinzema
Calibration Technician

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

2/22/00

08/24/05 14:40 FAX 716 685 3886

PCB PIEZOTRONICS

002/00

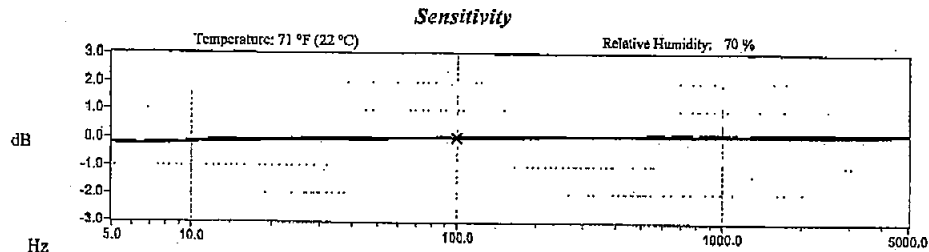
~ Calibration Certificate ~

Per ISO 18003-21

Model Number: 301M09/484B (394MI7 SYSTEM)Serial Number: 862/2470Description: ICP® AccelerometerMethod: Back-to-Back Comparison CalibrationManufacturer: PCB

Calibration Data

Sensitivity @ 100.0 Hz **31.05 mV/g** Output Bias **8.6 VDC**
 (3.17 mV/m/s²) Transverse Sensitivity **3.0 %**



Data Points

Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)
5.0	-2.3	REF. FREQ.	0.0	5000.0	1.8
10.0	-1.9	300.0	0.6		
15.0	-1.4	500.0	0.8		
30.0	-0.7	1000.0	1.0		
50.0	-0.4	3000.0	1.4		

Mounting Surface: Stainless Steel w/Silicone Grease Coupling Fastener: Steel Mount Vertical
 Acceleration Level (ms²): 100 g (981 m/s²)
 *The acceleration level may be limited by shaker displacement at low frequencies. If the limit level cannot be obtained, the calibration system uses the following formula to set the vibration amplitude: Acceleration Level (g) = 0.010 x (Hz)^{1/2}
 *The gravitational constant used for calculations by the calibration system is: 1 g = 9.80665 m/s².

Condition of Unit

As Found: In Tolerance, No Adjustment NecessaryAs Left: In Tolerance

Notes

1. Calibration is NIST Traceable thru Project 822/271196 and PTB Traceable thru Project 5399.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 9001, ISO 10012-1, ANSI/NCSL Z540-1-1994 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. Due to state of the art limitations, the test accuracy ratio is 2:1. Measurement uncertainty (95% confidence level with coverage factor of 2) for frequency ranges tested during calibration are as follows: 5-9 Hz; +/- 2.0%, 10-99 Hz; +/- 1.5%, 100-1999 Hz; +/- 1.0%, 2-10 kHz; +/- 2.5%.

Technician: Chuck DiMaggio Date: 06/13/05

Cert No 7862-01

PAGE 1 of 1

PCB PIEZOTRONICS
 VIBRATION DIVISION

3425 Walden Avenue Depew, NY 14043
 TEL: 888-684-0013 FAX: 716-685-3886 www.pcb.com

c03 - 200105/19.10

~Certificate of Calibration~

Model Number: 484B

Serial Number: 2470

Description: Signal Conditioner

Test Procedure: AT-106-1

Temperature: 70° F

N.I.S.T. Project #: F2565002/5UU2VF-2-
1/81000539626720012

Calibration Date: 6/15/2005

Recalibration Date:

Calibration Technician: James Higbee 2b *JH*

Relative Humidity: 54%

Volts	Current (mA)	Gain*
24.0	3.85	1.000

As Received: In tolerance, no adjustment required.

As Left: In tolerance.

Special Notes:

This document certifies that the equipment referenced above meets published specifications. The calibration procedure is in compliance with ISO 10012-1, and former MIL-STD-45662A and is traceable to NIST. *Measurement uncertainty (95% confidence level w/coverage factor of 2) for scale factors is +/- 0.2%.

This certificate may not be reproduced, except in full, without written approval of
PCB Piezotronics, Inc.



3425 Walden Avenue Depew, New York, USA 14043-2495

For any questions concerning this certificate, please call PCB at (716) 684-0001 and ask for an application engineer.