Honeywell NextGen Aviation Human Factors Research & Development

Viewable Stowage of Portable Electronic Devices in the Flight Deck: Environmental Test Report

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Table of Contents

Executive Summary 6

1 Introduction 7

2 Environmental/Safety Analysis of PED Temporary Securing Solutions 8

2.1 Temperature 11

2.2 Operational Shock & Emergency Landing 18

2.3 Vibration 22

2.4 Humidity 28

2.5 Altitude 30

2.6 Sunlight/UV Exposure 32

2.7 Aircraft Windscreen Cleanliness 36

2.8 Effects of Painted Surface 41

2.9 Effects of Turbulence 43

2.10 Summary of Environmental Tests 46

3 Conclusions and Recommendations 48

4 References 49

Appendix A: Environmental Test Results 50

Vibration 50

Humidity 356

Altitude 360

List of Figures

Figure 1. Thermotron SM8-C 12
Figure 2. Experimental Set-up in Chamber 12
Figure 3. Test Profile for Ground Survival Low Temp & Short Term Operating Low Temp Test 13
Figure 4. Test Profile for Ground Survival High Temperature & Short Term Operating High Temperature Test 15
Figure 5. Suction Cup A Failure (fell off at +55°C) 16
Figure 6. Suction Cup E Failure / Deformation at +85°C 16
Figure 7. Temperature Variation Test Profile 18
Figure 8. Operational Shock Representative Positive Shock Pulses (Suction Cup E) 20
Figure 9. Operational Shock Representative Negative Shock Pulses (Suction Cup D) 21
Figure 10. Emergency Landing Representative Positive Shock Pulses (Suction Cup A) 22
Figure 11. Suction Cup A on Vibration Table (mounted for front to back axis) 23
Figure 12. Suction Cup B on Vibration Table (mounted for side to side axis) 23
Figure 13. Suction Cup C on Vibration Table (mounted for vertical axis) 24
Figure 14. DO-160F Random Vibration Curve C (Suction Cup C) 25
Figure 15. DO-160F Sine Vibration Curve R (Suction Cup B) 26
Figure 16. DO-160F Sine Vibration Curve R (Suction Cup A) – FAILED TEST 27
Figure 17. Suction Cup A Failure During Sine Curve R Vibration Test 27
Figure 18. Thermotron FM-35-CHM-5-810C Humidity Chamber 28
Figure 19. Suction Cup Temporary Securing Solutions with Loads in Chamber Pre-Test 29
Figure 20. Suction Cup Securing Solutions on C 182 Windscreen Post-Test 29
Figure 21. Humidity Profile for One 24-hour Cycle 30
Figure 22. Thermotron Altitude Chamber 31
Figure 23. Experimental Set-up in Chamber 31
Figure 24. Modified Altitude Test 32
Figure 25. Experimental Set-up for Sunlight / UV Outdoor Test 33
Figure 26. Sine Curve R – Surface Cleaner Experiment (Suction Cup B shown) 37
Figure 27. Dusty Windscreen Test 38
Figure 28. Dusty Windscreen Test Setup on Vibration Table 39
Figure 29. Oily Fingerprint Test 40
Figure 30. Sine Curve R – Oily Surface Experiment (Suction Cup B shown) 41
Figure 33. Painted Surface Experiment (Suction Cup F shown) 42
Figure 34. Sine Curve R – Painted Surface Experiment (Suction Cup B shown) 43
Figure 35. Crew Interface Motion System (CIMS 44
Figure 36. Overview of Mounting Locations with Securing Solutions in Place 45
Figure 37. Suction Cup Securing Solution Attached to a Windscreen and Anchored to the Simulator – Large Display Attached 46
Figure 38. Suction Cup Securing Solution Attached to a Windscreen and Anchored to the Simulator – Medium Display Attached 46

List of Tables

Table 1. Temporary Securing Solutions 6
Table 2. Description of Suction Cup Wind Screen Securing Solutions 9
Table 3. FAA EFB Environmental Test Plans for PED Securing Solutions 10
Table 4. Test Summary for Ground Survival Low Temp & Short Term Operating Low Temp Tests 13
Table 5. Test Summary for Operating Low Temp Tests 14
Table 6. Test Summary for Ground Survival High Temp & Short Term Operating High Temp Tests 15
Table 7. Test Summary for Operating High Temp Tests 17
Table 8. Test Summary for Temperature Variation Tests 18
Table 9. Description of Suction Cup Securing Solutions 34
Table 10. Log of Sunlight / UV Exposure Test 34
Table 11. Range of Excursions, Accelerations and Velocities for CIMS 44
Table 12. Summary of Environmental Test Results 47

Acronyms & Abbreviations

A/C	Aircraft
AC	Advisory Circular
AEG	Aircraft Evaluation Group
ANOVA	Analysis of variance
ASI	Aviation Safety Inspector
AZ	Arizona
BKSP	Backspace
C 182	Cessna 182
C 560	Cessna 560
C	Celsius
CAT	Category
CFR	Code of Federal Regulations
CIMS	Crew Interface Motion System
CLR	Clear
DUR	Duration
EFB	Electronic flight bag
EMG	Electromyography
ex	example
F	Fahrenheit
FAA	Federal Aviation Administration
FSDO	Flight Standards District Office
ft	foot or feet
G or g	Acceleration of gravity
GPS	Global Positioning System
hr	hour
IAP	Instrument Approach Procedure
IFR	Instrument Flight Rules
in	inch
k	kilo
LAT	Lateral
MEL	Minimum Equipment List
min	minute
ms	millisecond
MSL	Mean Sea Level
N	Newton
na	not applicable
NACO	National Aeronautical Charting Office
nav	navigation
NexGen	Next Generation
P/N	Part Number
PED	Portable Electronic Device
PI	Principal Inspector
RH	Relative Humidity
sec	second
SOP	Standard Operating Procedure
STDEV	Standard Deviation
T or Temp	Temperature
t/o	takeoff
UV	Ultra-violet

Executive Summary

The purpose of this research effort was to conduct a series of analyses and empirical studies to catalog temporary securing solutions (also known as 'Viewable Stowage" per AC 120-76 current edition) for portable electronic devices (PEDs) authorized for use as EFBs, and identify general human factors considerations related to the safety, reliability, and usability of the different temporary securing solutions under different environmental and operational conditions. This report documents the engineering environmental testing performed by Honeywell to gather data on temporary securing solutions being used with PEDs in the flight deck.

Seven temporary securing solutions were selected for environmental evaluation, six of which were suction cups and one of which was a yoke securing solution. These temporary securing solutions were evaluated for attachment integrity as well as structural robustness. It is important to note that the FAA is not encouraging the use of any of these temporary securing solutions but rather was interested only in understanding their human factors implications. Evaluations conducted are summarized in Table 1:

Table 1. Temporary Securing Solutions

Temporary Securing Solution	Environmental Evaluation
Six different suction cup types (see Table 2 for further description)	• Attachment and structural robustness in conditions of: • Vibration/shock/turbulence • Altitude • Temperature • Humidity • UV exposure • Attachment surface types & preparations • Turbulence
Yoke securing solution	• Evaluated attachment and structural robustness during vibration • Turbulence

Environmental Evaluation Results

Evaluations were conducted per environmental requirements as defined in RTCA DO-160F: *Environmental Conditions and Test Procedures for Airborne Equipment*. Five of the six types of suction cup passed most RTCA DO-160F environmental tests, with a few isolated failures associated with temperature, and exposure to the weather elements (UV sunlight). However, *all* suction cups fell off their attachment surface points when exposed to high altitudes (25,000 to 27,000 ft pressure altitudes). Also noted were the importance of proper cleaning/preparation of the suction cup and its attachment surface point. Contaminants, such as dust and dirt, compromised the integrity of the attachment. Additionally, dust contamination resulted in detachment of all of the suction cups when exposed to vibration. Use of isopropyl alcohol was determined to be a suitable method of cleaning & preparation.

1 Introduction

EFBs are an important flight deck enabling technology for achieving NextGen operational improvements and capabilities. FAA Advisory Circular (AC) 20-173 addresses installation of EFBs, and AC 120-76B addresses airworthiness, certification, and operational authorization related to EFBs. Securing of Portable Electronic Devices (PEDs) that provide an EFB function are not addressed fully in these regulatory and guidance materials. The FAA recognizes that the way PEDs are secured in the cockpit can have safety, reliability and usability issues. Additionally, the securing method can also create issues related to the stability, durability, susceptibility to damage, and unintentional detaching of the EFB/PED and securing device combination. Thus, the FAA requested that Honeywell conduct a series of analyses and empirical studies to catalog temporary securing solutions for PEDs which have been authorized for use as EFBs, and to identify human factors considerations for their safety, reliability, and usability under different environmental and operational conditions. Although some of the temporary securing solutions examined may currently be more common in general aviation aircraft, these same temporary securing methods may be authorized on Air Transport flight decks in the future to achieve NextGen operational improvements and consequently affect airworthiness of those aircraft. The use of any temporary securing solution requires coordination with and/or authorization from the FAA Principal Inspector who has certificate holder oversight responsibility. The results of this research are intended to inform the development of guidance and evaluation criteria for temporary securing solutions and their use on the flight deck.

Seven PED temporary securing solutions were selected for environmental evaluation:

- Six different suction cups
- Yoke securing solution

Note that while the key focus of this research was the use of suction cups, limited evaluation also took place for the yoke securing solution for temporarily securing PEDs in the flight deck. While suction cups are not the only temporary securing solution currently in use, they are very common, and understanding the diversity of types of suction cups, surfaces to which they are secured, securing locations, method of securing, and susceptibility to improper mounting, etc., is necessary to ensure potential safety, reliability, and usability. It is important to note that the FAA is not encouraging the use of any of these temporary securing solutions but rather was interested only in understanding their human factors implications.

The temporary securing solutions were subjected to tests appropriate for each securing method in various environmental facilities capable of running RTCA DO-160F environmental tests. The specific tests for suction cups included:

- Temperature and Humidity per RTCA DO-160F
- Vibration and Shock tests
- Altitude (Pressure)
- Effects of sunlight / UV
- Effects of surface
- Effects of turbulence

The limited tests conducted for the yoke securing solution included vibration per RTCA DO-160F as well as performance in turbulence.

The results of the environmental tests were then further analyzed to determine the causes of failure modes and identified issues and identify possible mitigations. Extensive test data can be found in Appendix A.

2 Environmental/Safety Analysis of PED Temporary Securing Solutions

To understand the safety impact related to temporary securing solutions, it was necessary to gather information about these solutions in the environment in which they would be used. For avionics, RTCA DO-160F: "Environmental Conditions and Test Procedures for Airborne Equipment" defines a series of tests to ensure the safety and reliability of the equipment being tested. . We chose to use and apply these environmental tests on six suction cups and one yoke securing solution to identify general human factors considerations with respect to their use. All environmental tests, with the exception of the Sunlight / UV Exposure test were carried out with an actual PED or PED-replicate load to simulate aircraft conditions with a device installed in the temporary securing solution.

Descriptions and photos of each suction cup tested are shown in Table 2. All names of manufacturers of the temporary securing solutions have been de-identified. It is important to note that the purpose of the evaluations was not to compare the temporary securing solutions but rather to identify and understand general human factors considerations. A summary of tests conducted are described in Table 3. For each environmental condition, categories of tests (e.g. A, B, etc.), were chosen which represent the most severe environment to which the PED is expected to be exposed to during its service life. The environmental conditions associated with each category are described in the summary section of Table 3. Details for each type of test follow in subsequent sections of this report.

Environmental tests conducted included temperature, temperature variation, operational shock and emergency landing, vibration, humidity, altitude, sunlight/IV exposure, effects of surface being adhered to and effects of turbulence. In an effort to conserve time, environmental tests were conducted in parallel on multiples of each type of suction cup securing solution. For example, temperature testing, vibration testing and UV/Sunlight degradation testing were begun at similar timeframes. When a securing solution exhibited failure in more than one of these tests, it was discontinued from further testing. Details of these tests are expanded in subsequent sections.

Table 2. Description of Suction Cup Wind Screen Securing Solutions

Suction Cup	Description	Photo of Securing Solution
A	Dual Suction Cup 2.5” diameter ABS plastic with adhesive on suction cup surface	
B	Single Suction Cup 3” diameter clear plastic suction cup Industrial grade locking suction	
C	Dual Suction Cup 3” diameter clear plastic suction cup Industrial grade locking suction	
D	Single Suction Cup 3” diameter clear plastic with non-corrosive base and throw-over lever for locking suction	
E	Single Suction Cup 3.25” diameter black plastic twist lock suction cup base	
F	Double Suction Cup 3.25” diameter black plastic twist lock suction cup base	

Table 3. FAA EFB Environmental Test Plans for PED Securing Solutions

Test Description	Category	Suction Cup	Yoke Securing Solution	Summary
Temperature	A/B	X		Operating: -20°C to +55°C Short Term Operating: -40°C to +70°C Survival: -55°C and +85°C
Altitude	A/B	X		Altitude: 16.8 k-meters (55 k-feet) Overpressure: -4.6 k-meters (-15 k-feet) Decompression 16.8 k-meters (55 k-feet)
Temperature Variation	B	X		5°C/Minute
Humidity	A	X		10-Cycles with 1 Cycle/24 Hours 65°C @ 95±4% RH for 6 Hrs each cycle Transition to 38°C @ >85% RH
Operational Shock & Emergency Landing	B	X		Operational 6G, 11ms & 20ms, 3 Pulses each direction CFR 25.561: 9G
Vibration	S/H	X	X	Random Curve C Sinusoidal Curve R
Sunlight/UV Exposure		X		Direct Exposure to AZ Sun
Effects of Surface		X		Dirty, vs. Clean Effects of Surface Cleaners Adherence Methods (saliva, water, etc) Mounting Surface (material, shape)
Effects of Turbulence		X	X	Light and Moderate

2.1 Temperature

Temperature tests were conducted to determine the performance characteristics of suction cup temporary securing solutions at the applicable temperatures defined in RTCA DO-160F, Section 4 Category A/B. Temperature tests were performed on suction cups A, B, C, D, E and F. A Thermotron Model SM8-C environmental chamber with a Model 2800 controller was used for these tests, as shown in Figure 1. To conduct the test, numerous thermocouples were attached to a C560 aircraft storm window, PED and suction cups to record and monitor temperatures during the temperature tests. Thermal couple data was recorded using an Agilent 34907 Data Acquisition Unit. An experimental set-up of an actual device and temporary securing solution inside the temperature chamber is shown in Figure 2.

The following methods and criteria were used to prepare each suction cup and conduct the temperature test:

1. Clean the suction cup and window (i.e., area suction cup will be adhered to) with isopropyl alcohol.
2. Attach suction cup to C560 aircraft storm window (shown in Figure 2).
3. Gather baseline performance data by measuring the force required to detach suction cup prior to temperature tests (via Digital Force Gauge).
4. Place the window with suction cup attached in environmental chamber.
5. Attach thermocouple leads.
6. Run temperature tests with load (PED or replicate load).

Ispopropyl alcohol was used to clean the surfaces due to the fact that it dissolves a wide range of water-insoluble materials, is relatively non-toxic compared to alternative solvents, and evaporates quickly without leaving residue. It is widely used as a cleaning fluid, especially for dissolving oils.

Test Acceptance Pass / Fail Criteria

- Does it fall off?
- Does it crack?
- Does it begin to melt, or deform at high storage temp?
- Significant Degradation of attachment force

If the suction cup does not fall off, measure the detach force of suction cup from windscreen.

These results are elaborated in each section.

Figure 1. Thermotron SM8-C

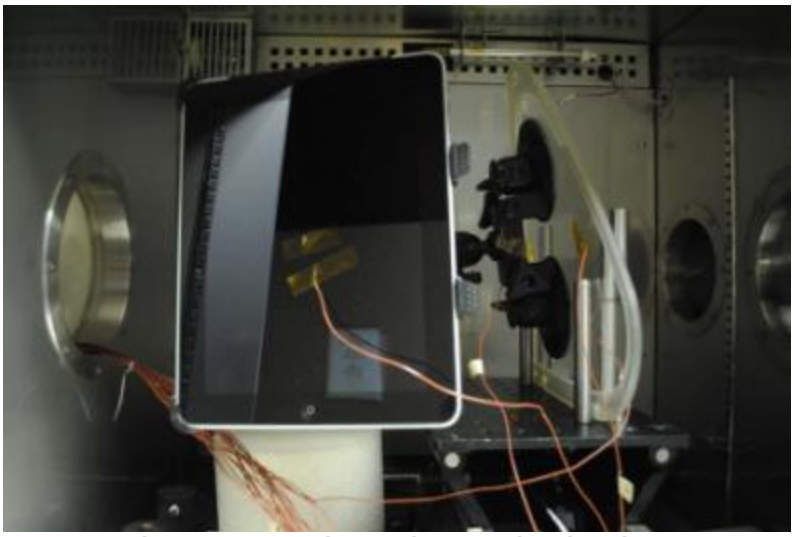


Figure 2. Experimental Set-up in Chamber

2.1.1 Ground Survival and Short Term Operating Low Temperature

Low Temperature Ground Survival and Short Time Operating Low Temperature tests were conducted on suction cups A, B, C, D, E and F per RTCA DO-160F Section 4 Category A/B. Low Temperature Ground Survival and Short Time Operating Low Temperature tests simulate temperature conditions that may be encountered by the suction cup while the aircraft is on the ground. Ground survival low temperatures are

the lowest temperatures that the suction cup would normally be expected to be exposed to during aircraft storage or during exposure to climatic extremes. The equipment is not expected to operate within specification limits at these temperatures but is expected to survive without damage. Short-term operating low temperatures are startup conditions where the suction cups are put into use following a ground soak. It is expected these temperature conditions will occur infrequently and be of short duration, since heated air circulation or other means of controlling the temperature would be enabled concurrent with equipment operation. The temperature test profile is shown in Figure 3 and described in Table 4 for reference.

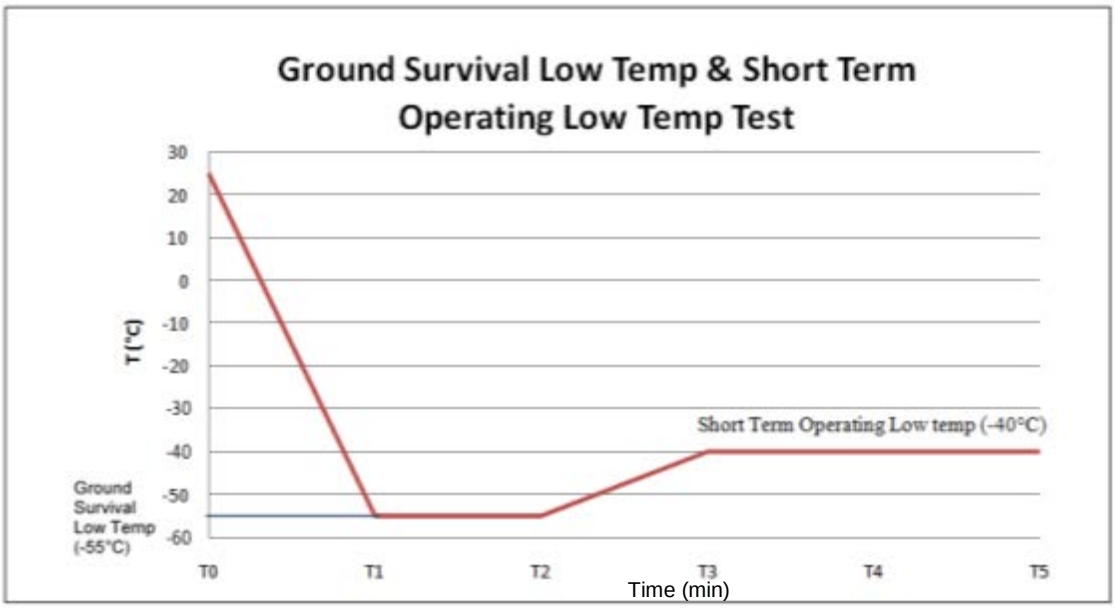


Figure 3. Test Profile for Ground Survival Low Temp & Short Term Operating Low Temp Test

Table 4. Test Summary for Ground Survival Low Temp & Short Term Operating Low Temp Tests

Test Description	Suction Cup	Test Results	Initial Detach Force	Post-test Detach Force
Stabilize thermal Chamber @ -55°C.	A	Pass	187.0 N	170.0 N
Soak three hours.	B	Pass	240.0 N	239.0 N
Transition @ 5°C/min to -40°C and stabilize 30 min.	C	Pass	245.0 N	244.0 N
Check integrity of suction cup every 10 min at -40°C for 30min	D	Pass	239.0 N	237.0 N
	E	Pass	245.0 N	244.0 N
	F	Pass	251.0 N	249.9 N

2.1.2 Operating Low Temperature

Operating low temperature is the lowest temperature at which the suction cups would normally be exposed and be required to operate.. Operating low temperature tests were conducted on suction cups A, B, C, D, E and F per RTCA DO-160F Category A/B. Suction cups A, B, C, D, E and F passed the

operating low temperature tests, which are summarized in Table 5. Since RTCA DO-160 F requires operating temperature to be at -20°C, suction cup integrity tests were conducted at -20°C every 10 minutes during the 2 hour test period. No failures were reported for any of the suction cups A, B, C, D, E and F.

Table 5. Test Summary for Operating Low Temp Tests

Test Description	Suction Cup	Test Results	Initial Detach Force	Post-test Detach Force
Stabilize thermal chamber @ -20°C.	A	Pass	187.0 N	174.0 N
Check integrity of suction cup every 10 min during 2 hours @ -20°C	B	Pass	240.0 N	238.7 N
Transition to +70°C and stabilize 30 min	C	Pass	245.0 N	244.0 N
	D	Pass	239.0 N	237.0 N
	E	Pass	245.0 N	244.0 N
	F	Pass	251.0 N	249.0 N

2.1.3 Ground Survival and Short Term Operating High Temperature

High Temperature Ground Survival and Short Time Operating High Temperature tests were conducted on suction cups A, B, C, D, E and F per RTCA DO-160F Section 4 Category A/B. High Temperature Ground Survival and Short Time Operating High Temperature tests simulate temperature conditions that may be encountered by the suction cups while the aircraft is on the ground. Ground survival high temperatures are the highest temperatures that the suction cups would normally be expected to be exposed to during aircraft storage or during exposure to climatic extremes. The equipment is not expected to operate within specification limits at these temperatures but is expected to survive without damage. Short-term operating high temperatures are startup conditions where the suction cups are put into use following a ground soak. It is expected these temperature conditions will occur infrequently and be of short duration, since cooled air circulation or other means of controlling the temperature would be enabled concurrent with equipment operation. Temperature test profile is shown in Figure 4 and described in Table 6 for reference.

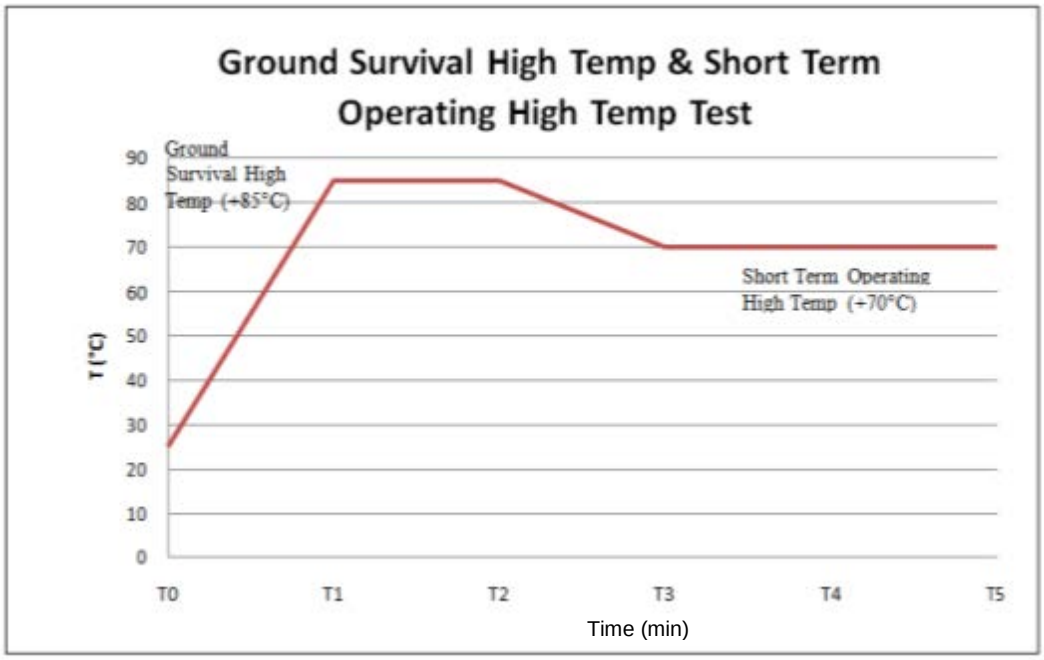


Figure 4. Test Profile for Ground Survival High Temperature & Short Term Operating High Temperature Test

Table 6. Test Summary for Ground Survival High Temp & Short Term Operating High Temp Tests

Test Description	Suction Cup	Test Results	Initial Detach Force	Post-test Detach Force
Stabilize thermal Chamber @ +85°C. Soak three hours. Transition to +70°C and stabilize 30 min. Check integrity of suction cup every 10 min at +70°C for 30 min	A	Failed at 55°C	187.0 N	0
	B	Pass	240.0 N	237.6 N
	C	Pass	245.0 N	244.0 N*
	D	Pass	239.0 N	237.9 N
	E	Failed at 85°C	244.7 N	244.0 N*
	F	Pass	250.1 N	249.9 N

During the ground survival and short term operating high temperature test, suction cup A fell off the window at +55°C; this was considered a “fail” (see Figure 5). Suction Cup E failed due to deformation of material between the suction cup and support structure at +85°C (Figure 6). Suction cups B, C, D and F passed temperature testing.

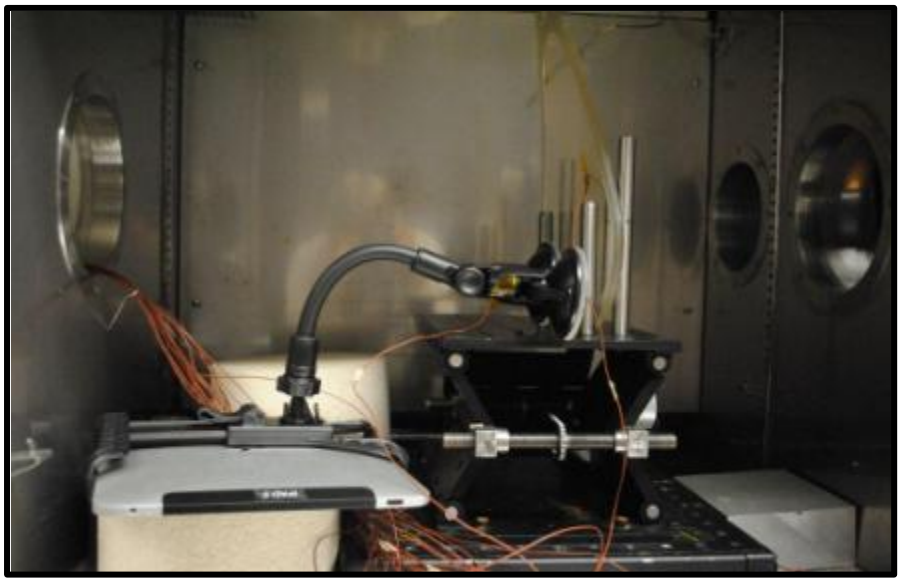


Figure 5. Suction Cup A Failure (fell off at +55°C)

Figure 6. Suction Cup E Failure / Deformation at +85°C

2.1.4 Operating High Temperature

Operating high temperature is the highest temperature at which the suction cups would typically be exposed within the flight deck and be required to function at during normal operating conditions. Operating high temperature tests were conducted on suction cups A, B, C, D, E and F per RTCA DO-160F Category A/B. Suction cups B, C, D, E and F passed the operating high temperature tests, which are summarized in summarized in Table 7. Suction cup A failed at +55°C during the operating high temperature tests. At +55°C integrity tests were conducted every 10 minutes during the 2 hour test period. No suction cup failures were reported for any of the temporary securing solutions tested other than suction cup A.

Table 7. Test Summary for Operating High Temp Tests

Test Description	Suction Cup	Test Results	Initial Detach Force	Post-test Detach Force
Stabilize thermal chamber @ +55°C. Check integrity of suction cup every 10 min during 2 hours @ +55°C	A	Failed at 55°C	187.0 N	0
	B	Pass	240.0 N	237.6 N
	C	Pass	245.0 N	244.0 N
	D	Pass	239.0 N	237.8 N
	E	Pass	244.7 N	244.0 N
	F	Pass	251.0 N	249.4 N

2.1.5 Temperature Variation

Temperature Variation tests determined the performance characteristics of the suction cups during temperature variations between high and low operating temperature extremes. Temperature variation tests were conducted on suction cups A, B, C, D, E and F per RTCA DO-160F Section 5 Category B. One cycle of the Temperature Variation test profile is shown in Figure 7 and described in Table 8 for reference. Suction cups B, C, D, E and F passed temperature variation tests, which are summarized in Table 8. Suction cup A failed at +55°C during temperature variation tests.

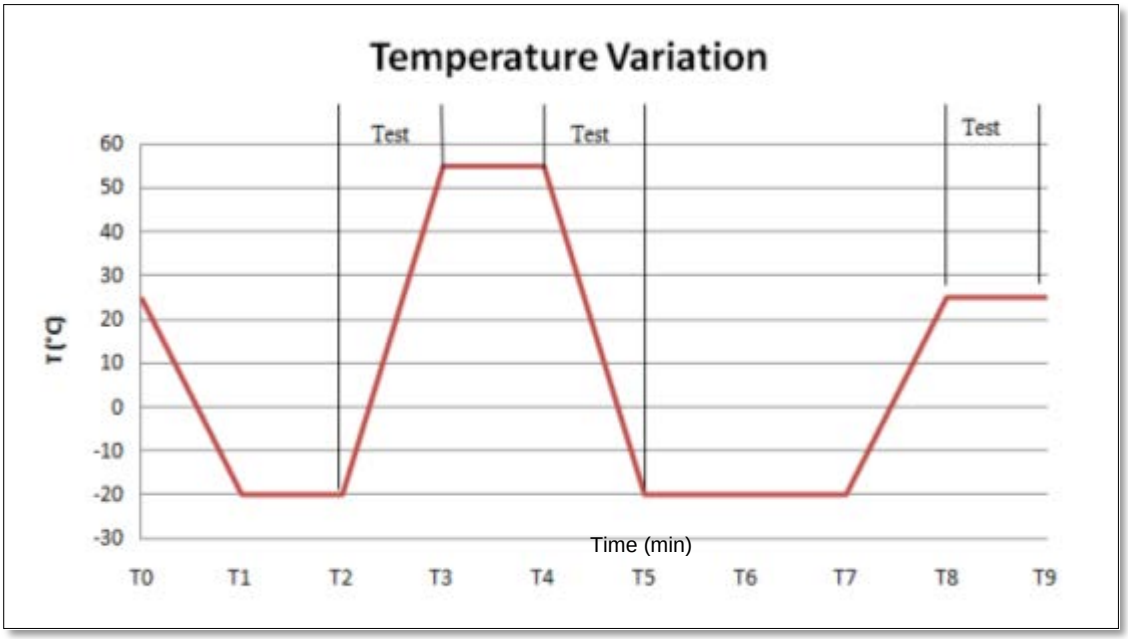


Figure 7. Temperature Variation Test Profile

Table 8. Test Summary for Temperature Variation Tests

Test Description	Suction Cup	Test Results	Initial Detach Force
Start at ambient temperature. Lower temp to -20°C. Stabilize @ -20°C.	A	Fail	na
Raise temp to +55°C @ 5°C/min.	B	Pass	240.0 N
Check integrity of suction cup every 2 min during transition.	C	Pass	245.0 N
Stabilize @ +55°C.	D	Pass	239.0 N
Transition to -20°C @ 5°C/min. Check integrity of suction cup.	E	Pass	244.7 N
Stabilize @ -20°C and hold temp for 60 minutes @ -20°C.	F	Pass	251.0 N
Check integrity of suction cup and hold temp for 30 minutes @ -20°C. Check integrity of suction cup. Transition temp to ambient (25°C) @ 5°C/min. Check integrity of suction cup. Repeat cycle.			

2.2 Operational Shock & Emergency Landing

Operational shock tests per RTCA DO-160F Section 7.2 Category B and Emergency Landing tests per CFR 25.561 were performed on suction cups A, B, C, D, E and F. It should be noted again the temperature tests, vibration tests, operational shock & emergency landing tests, and sunlight test were all begun at the same time.

The *operational shock test* verifies that the equipment will continue to function within performance standards after exposure to shocks experienced during normal aircraft operations. These shocks may occur during taxiing, landing, or when the aircraft encounters sudden gusts in flight. This test applies to all equipment installed on fixed wing aircraft and helicopters. Operational shock tests consisted of three positive and three negative, 11 and 20 millisecond, 6g pulses in each orthogonal axis. These axes are defined as front to back (longitudinal), side to side (lateral) and vertical.

The *emergency landing test* verifies that in the event of emergency landing conditions, the equipment will not cause injury or present a hazard to occupants. The equipment must be positioned so that if it breaks loose it will be unlikely to cause direct injury to occupants, penetrate fuel tanks or lines or cause fire or explosion hazard by damage to adjacent systems, or nullify any of the escape facilities provided for use after an emergency landing. Emergency landing tests consisted of one positive and one negative, 20 millisecond, 9g pulses in each orthogonal axis. These pulses were used for the forward inertia force shock (front to back).

An Unholtz-Dickie Model R30 shaker table with Unholtz-Dickie Model Vwin II controller was used to conduct the operational shock and emergency landing tests. Dummy 'replicate' loads were used on the shock test apparatus for both operational shock and emergency landing tests to ensure that the recorded pulse were within specified tolerances. Prior to attaching suction cups to the windscreen, both surfaces were cleaned with isopropyl alcohol to ensure good adherence of the suction cup to the windscreen. Additional information on this equipment, as well as copies of tests can be found in Appendix A.

Representative shock pulses are shown in Figure 8 (positive shock pulse), Figure 9 (negative shock pulse) for the operational shock test and Figure 10 for emergency landing shock test for reference.

In all cases, an accelerometer is placed on the suction cup, and the response of the suction cup during testing is measured by that accelerometer. The response of the suction cup is shown in black in both figures. The upper and lower limits of the acceptable range is shown in red (outside the acceptable range is considered fail). The suction cup response is shown in black and remained in the acceptable range.

All suction cups (A, B, C, D, E and F) passed the operational shock and emergency landing tests.

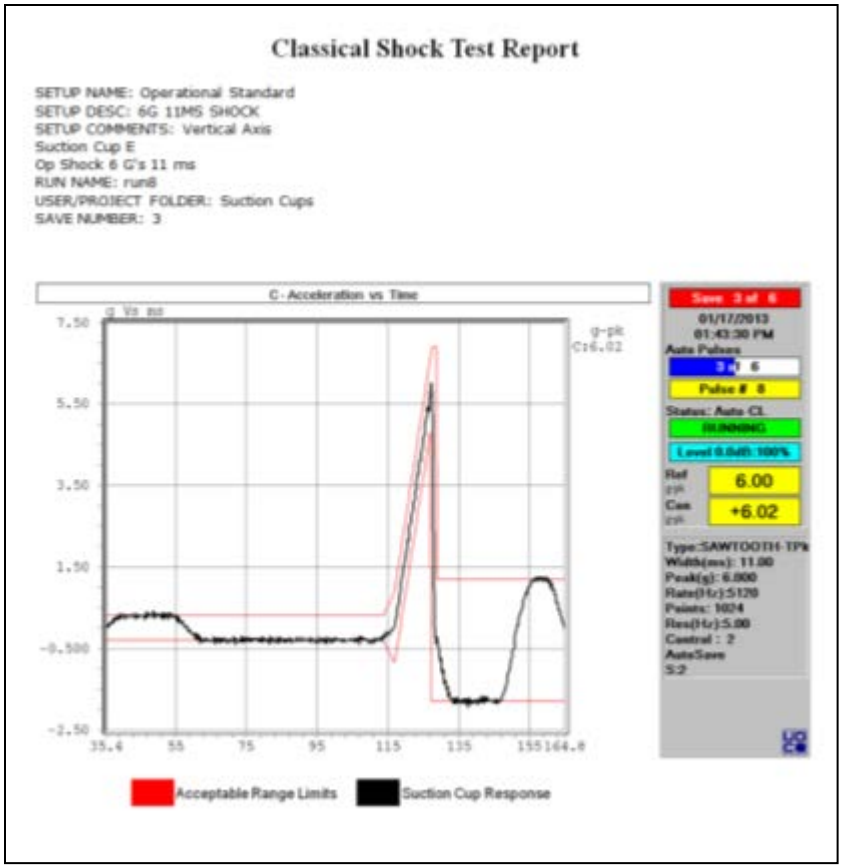


Figure 8. Operational Shock Representative Positive Shock Pulses (Suction Cup E)

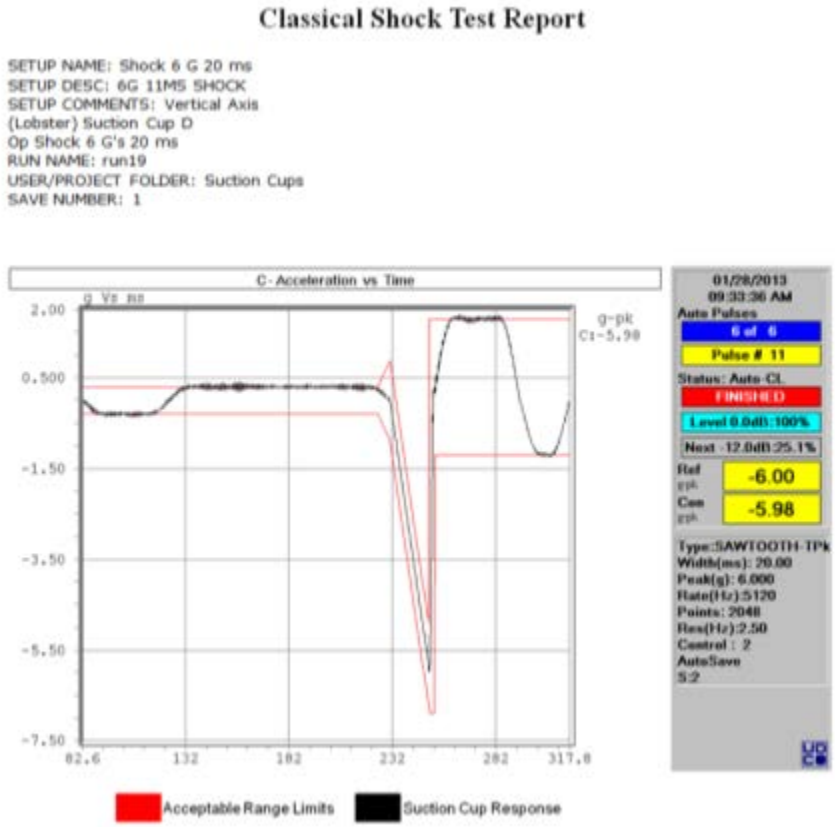


Figure 9. Operational Shock Representative Negative Shock Pulses (Suction Cup D)

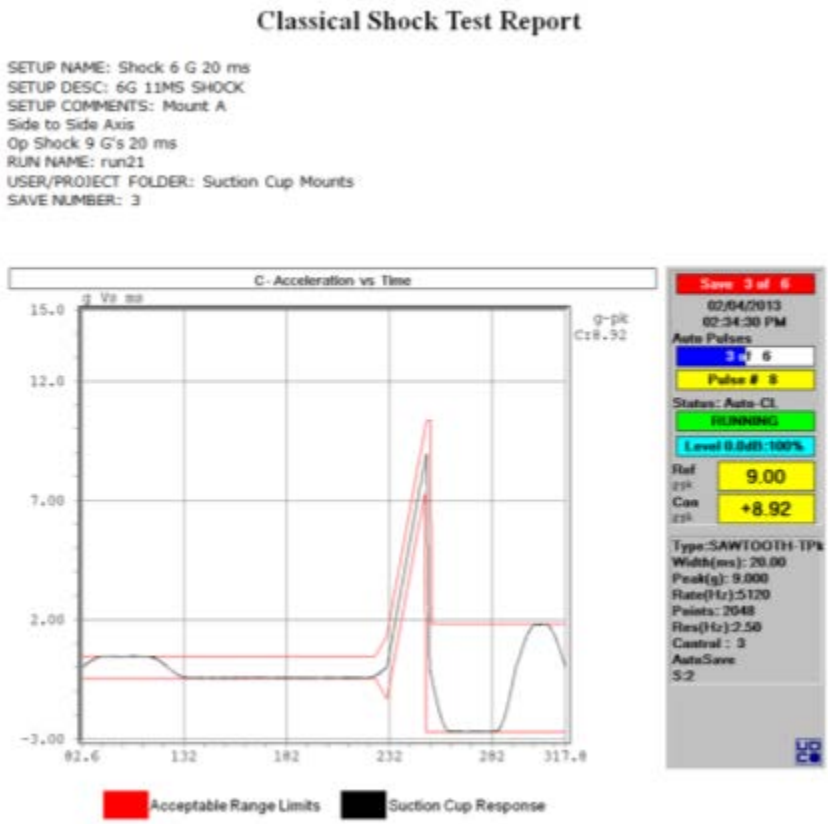


Figure 10. Emergency Landing Representative Positive Shock Pulses (Suction Cup A)

2.3 Vibration

Vibration tests per RTCA DO-160F Section 8 Category S and Category H were performed on suction cups A, B, C, D, E and F, as well as yoke securing solution, using Random Curve C and Sinusoidal Curve R. The vibration tests are intended to demonstrate that the equipment complies with the applicable performance standards (including durability requirements) when subjected to vibration levels specified for the appropriate system being used. The *standard vibration test* (Category S) for fixed wing aircraft demonstrates that equipment will meet its functional performance requirements in the vibration environment experienced during normal operating conditions of the aircraft. It consists of 1 hour per axis of sine or random vibration at performance levels. The random vibration Curve C was used for the tests with all suction cups and yoke securing solution.

High-level short duration transient vibration levels are encountered during abnormal fixed wing aircraft conditions that occur during an engine fan blade loss. The *high-level, short duration vibration test* (Category H) is applied to equipment in which a functional loss of performance can hazardously affect the aircraft's performance, and is a generalized test that encompasses all applications. It consists of high g and low frequency sweep of each axis (Swept Sine Curve R), and was used for suction cup testing.

Examples of the set ups for each of the three orthogonal axis for each suction cup securing solution can be seen in Figure 11, Figure 12 and Figure 13. These axes are defined as front to back (longitudinal), side to side (lateral) and vertical. Prior to attaching the suction cup to the windscreen, both surfaces were cleaned with isopropyl alcohol to ensure good adherence of the suction cup to the windscreen.

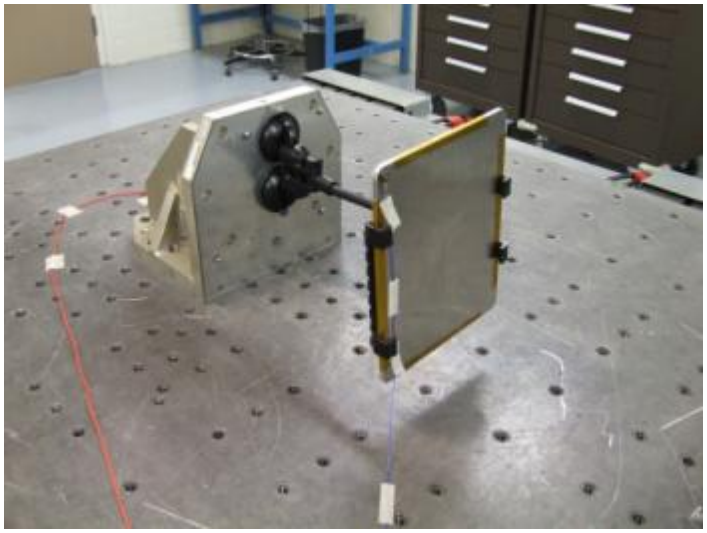


Figure 11. Suction Cup A on Vibration Table (mounted for front to back axis)

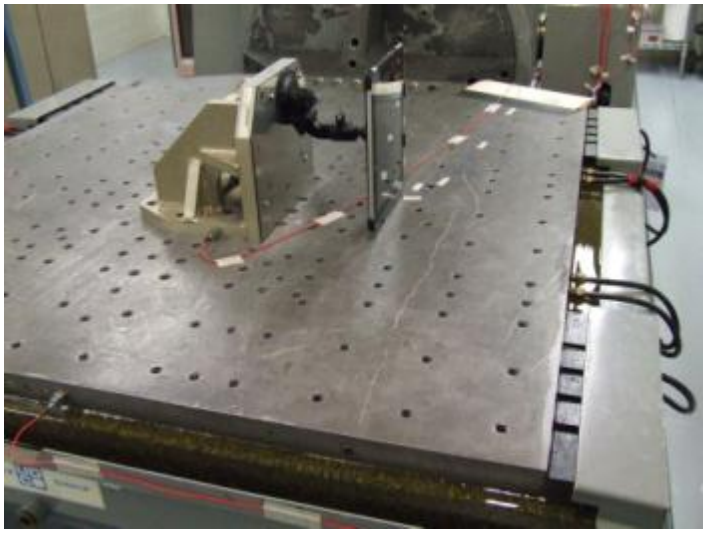


Figure 12. Suction Cup B on Vibration Table (mounted for side to side axis)

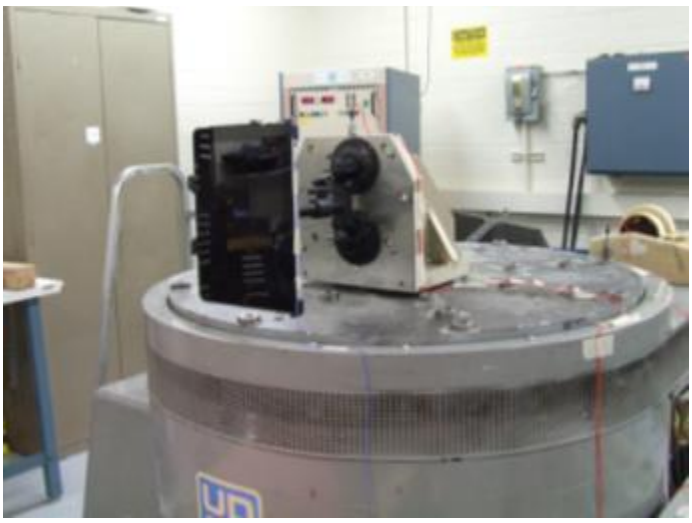


Figure 13. Suction Cup C on Vibration Table (mounted for vertical axis)

Each of the three orthogonal axes of each suction cup (with representative load) were subjected to the random vibration Curve C (such as shown in Figure 14) and to the 2.5 g sinusoidal vibration requirement from 10 to 250 Hz of Curve R (as shown in Figure 15) for one hour each.

In each of the figures - Figure 14, Figure 15, Figure 16 and Figure 17, an accelerometer is placed on the suction cup, and the response of the suction cup during testing is measured by that accelerometer. The response of the suction cup is shown in black in each figure. The upper and lower limits of the acceptable range is shown in red (outside the acceptable range is considered fail). The suction cup response is shown in black and remained in the acceptable range. The response shown in green is located on the front face of the display / touch surface. Since what was being tested was the integrity and reliability of the suction cup (shown in black), this suction cup passed this test.

Suction cups B, C, D, E and F passed all vibration tests. Suction cup A passed Sinusoidal Curve C but during Sinusoidal Curve R (side to side vibration), suction cup A separated from the C 182 windscreen. This was considered a “fail”. The plot of this failure is shown in Figure 16, followed by a photo of Suction Cup A during the failure in Figure 17. The yoke securing solution passed all vibration tests. Results for all vibration tests can be found in Appendix A.

Due to severity of failure in vibration *and* temperature testing, we decided not to include suction cup A in any further testing (with the exception of Sunlight/UV testing, which was started concurrently with temperature and vibration tests).

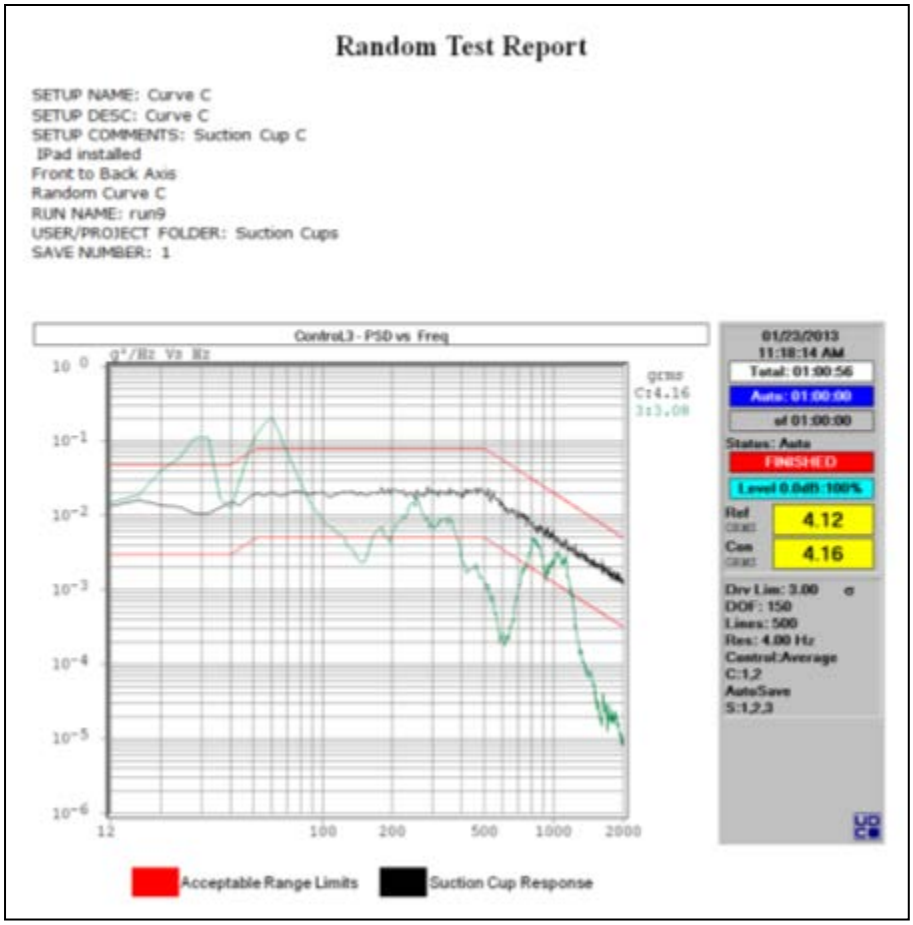


Figure 14. DO-160F Random Vibration Curve C (Suction Cup C)

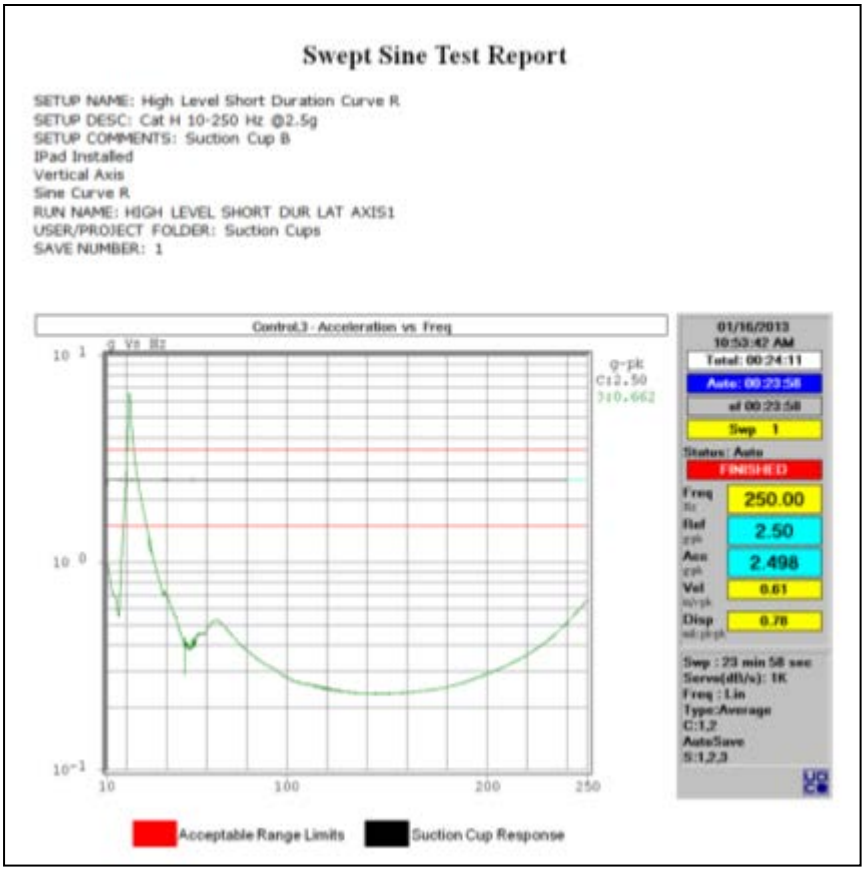


Figure 15. DO-160F Sine Vibration Curve R (Suction Cup B)

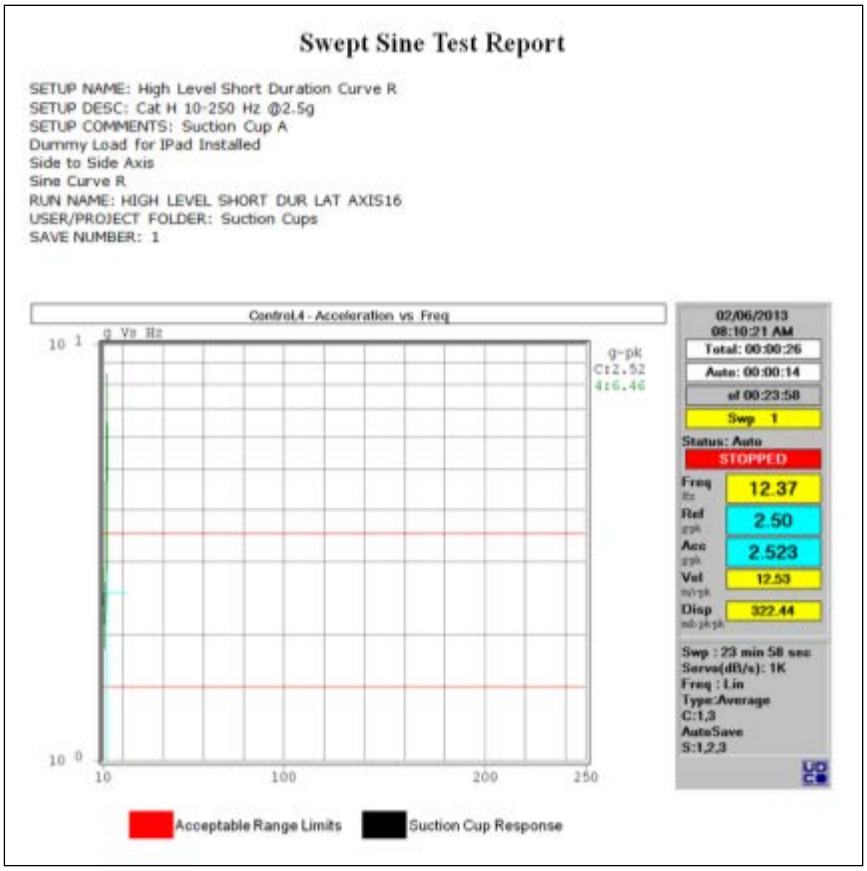


Figure 16. DO-160F Sine Vibration Curve R (Suction Cup A) – FAILED TEST

Figure 17. Suction Cup A Failure During Sine Curve R Vibration Test

2.4 Humidity

Ten-day severe humidity tests per RTCA DO-160F Section 6 Category B were performed on suction cups B, C, D, E and F. Suction cup A was not included in humidity testing due to failures described above. The *severe humidity tests* determined the ability of the suction cup temporary securing solutions to withstand either natural or induced humid atmospheres. The test was intended to examine any change of suction cup characteristics resulting from the absorption of humidity (e.g., adhesion of suction cup to the surface of the aircraft windscreen). The *severe humidity test* is intended for equipment installed in zones not environmentally controlled and may be required to operate under conditions such that it is subjected to a more severe atmospheric humidity environment for extended periods of time in excess of that specified for the standard humidity environment. All of the suction cups were tested with PED replicate loads to simulate aircraft conditions with a device installed. Suction cups B, C, D, E and F were temporarily secured to a portion of a C182 aircraft windscreen prior to installing them into the test chamber. All suction cups were run through the 10 day test at the same time, and were monitored 3 times daily (beginning, middle and end of shift) to ensure integrity of suction cup / adherence to the windscreen (made sure none had fallen off).

A Thermotron Model FM-35-CHM-5-810C with Model 7800 Control System test chamber was used for the humidity tests, as shown in Figure 18. Additional information on this equipment can be found in Appendix A. The experimental set-up of all devices temporarily secured to the C 182 windscreen before testing is shown in Figure 19 (Before), and Figure 20 shows the mounted devices *after* the 10 day test. One 24 hour cycle of the 10 day humidity test profile is depicted in Figure 21.

Suction Cups B, C, D, E, and F all passed the humidity tests (suction cup A was not tested).

Figure 18. Thermotron FM-35-CHM-5-810C Humidity Chamber

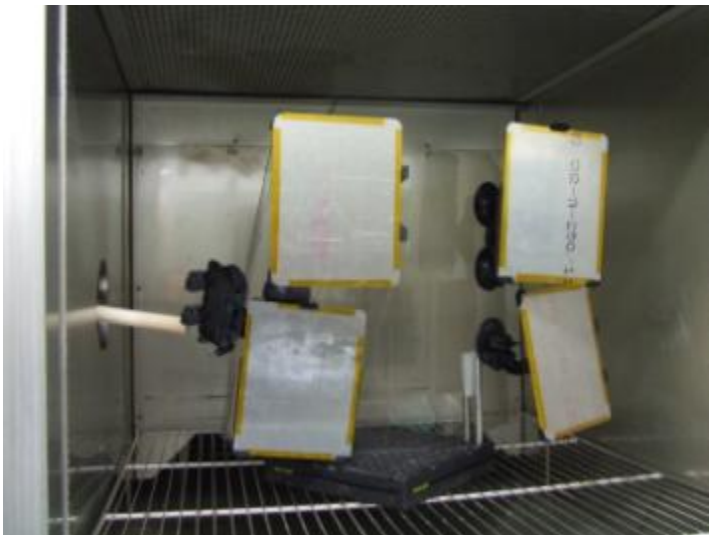


Figure 19. Suction Cup Temporary Securing Solutions with Loads in Chamber Pre-Test

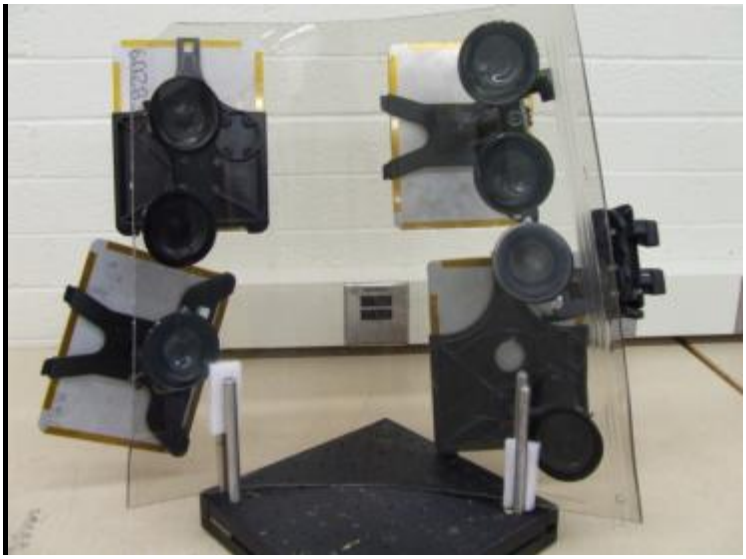


Figure 20. Suction Cup Securing Solutions on C 182 Windscreen Post-Test

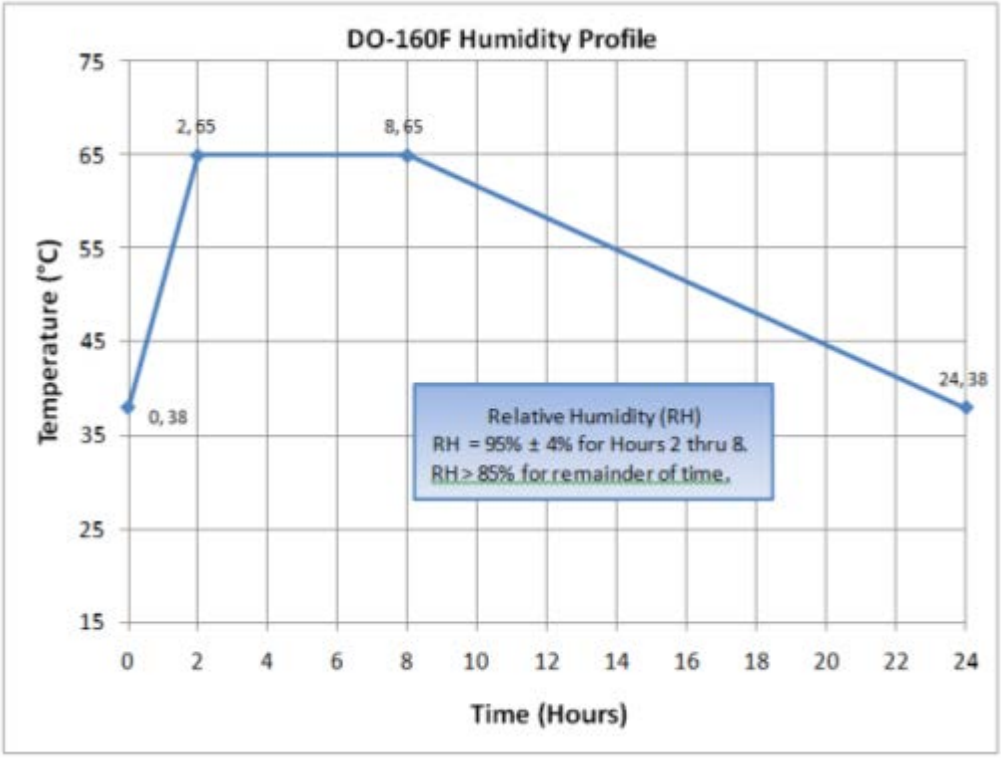


Figure 21. Humidity Profile for One 24-hour Cycle

2.5 Altitude

Altitude tests determined the performance characteristics of the effects of low pressure and high altitude on the suction cup securing solutions; in particular, if the suction cups would stay adhered to an aircraft windscreen during such conditions. A Thermotron Altitude test chamber was used for these tests, as shown in Figure 22. An experimental set-up of an actual device and suction cup temporary securing solution inside the temperature chamber is shown in Figure 23.

Figure 22. Thermotron Altitude Chamber

Figure 23. Experimental Set-up in Chamber

The original plan was to ramp to 55000 ft, but none of the suction cups stayed adhered to the windscreen past 27000 feet. Since it was unknown exactly at what altitude the suction cups would fail, an improvised altitude profile was developed and used. Figure 24 describes the test profile used for the suction cups.

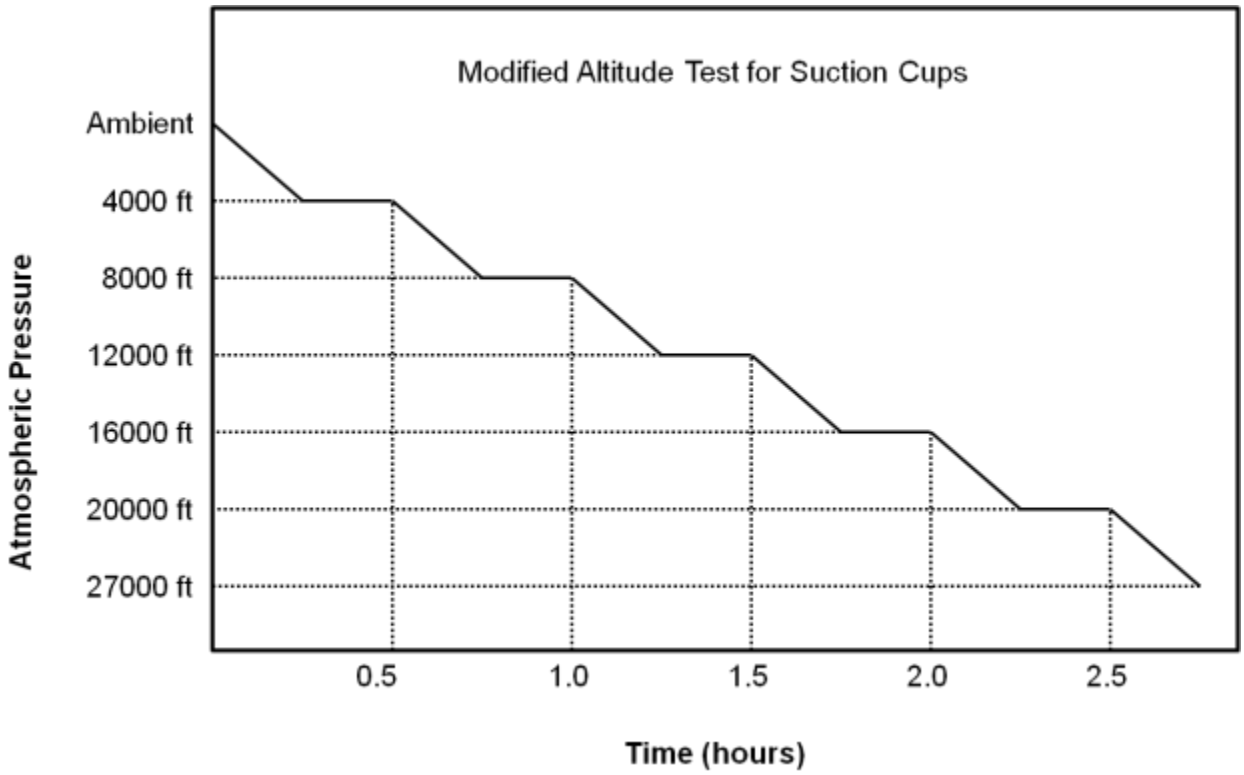


Figure 24. Modified Altitude Test

Altitude Profile:

1. Ramp to 4000 ft; dwell 30 min.
2. Ramp to 8000 ft; dwell 30 min.
3. Ramp to 12000 ft; dwell 30 min.
4. Ramp to 16000 ft; dwell 30 min.
5. Ramp to 20000 ft; dwell 30 min.
6. Ramp to failure, which occurred between 25500 – 27000 feet for all suction cups, with the exception of suction cup A, which was not tested (ruled out in temperature and vibration testing).

To ensure these altitude test results were repeatable, this test was performed three times for each suction cup with similar results. Suction cups B, C, D, E, and F all fell off between 25500 – 27000 feet. The slight variation might be attributed to the possibility of not securing the suction cup in exactly the same spot on the surface of the windscreen. The altitude at which each suction cup fell off is noted in Appendix A.

2.6 Sunlight/UV Exposure

Sunlight and ultra violet light can eventually cause degradation in suction cup style temporary securing solutions such as those used in automobiles to attach GPS units to windshields, etc. To determine if sunlight / UV exposure affected suction cups mounted to the inside of an aircraft windscreen, a long-term

test was run for 7+ months. The test started on December 14, 2012 and continued until July 31, 2013. Because this test started concurrently with temperature and vibration testing, suction cup A was included. Suction cups A, B, C, D, E, and F were mounted to the inside of a portion of a C182 windscreen and placed in an outdoor location in Desert Hills, AZ. The inside of the windscreen as well as suction cups were first cleaned with isopropyl alcohol to optimize the adherence to a clean surface.

One early finding was that the suction cups did not stay adhered to curved sections of the windscreen. At the start of this test, it was hoped the suction cups would be able to be placed at several different locations to understand how surface flatness affects adherence of the suction cup to the windscreen. When various suction cups were placed across the windscreen however, *all* suction cups attached to curved areas detached within 2 hours of being attached to the windscreen (fell off the windscreen). This windscreen test was repeated 5 times with the same results.

The fact that the suction cups would not stay adhered to the curved sections of the windscreen drove the need to determine the best mounting location for suction cups. This was also necessary to enable the sunlight / UV study to commence. After further test to determine the best attachment location, we determined the PED suction cups must be mounted to a flat section of the windscreen because this provided the best adhesion, keeping the suction cups on the windscreen for the ensuing test.

The sunlight / UV degradation experimental set-up on the C 182 windscreen can be seen in Figure 25. Each suction cup is identified with its corresponding label (A, B, C, etc.).

A description of each type of suction cup and its' corresponding label is repeated in Table 9 to aid with identification.

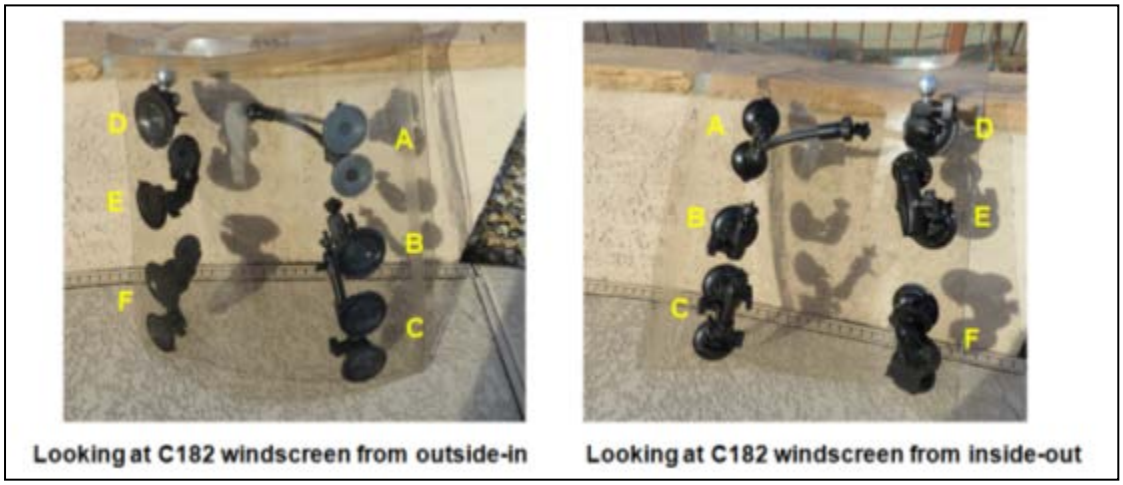


Figure 25. Experimental Set-up for Sunlight / UV Outdoor Test

Table 9. Description of Suction Cup Securing Solutions

Label on Windscreen	Description
A	Dual Suction Cup Wind Screen Securing Solution
B	Single Suction Cup Wind Screen Securing Solution
C	Dual Suction Cup Wind Screen Securing Solution
D	Single Suction Cup Wind Screen Securing Solution plus Cradle
E	Single Suction Cup Wind Screen Securing Solution
F	Double Suction Cup Wind Screen Securing Solution

Adherence of the suction cups to the windscreen was monitored for degradation, de-attachment from windscreen, etc, from inception on December 14, 2012 until cessation of experiment on July 31, 2013. The results are summarized in Table 10, which shows a log of sunlight / UV exposure test results. Details of the test follow the table.

Table 10. Log of Sunlight / UV Exposure Test

	Sunlight / UV Degradaton Tests															
	2012	2013														
High Temp (°F)	61°	65°	40.5°	97°	103°	101°	112°	107°	110°	105°	98°	103°	105°	108°	108°	109°
Day Mount Fell Off	12/14	2/13	2/20	5/20	5/22	5/24	7/7	7/9	7/15	7/19	7/22	7/26	7/27	7/28	7/30	7/31
Day of Test	1	42	52	133	135	137	181	183	189	193	196	200	201	202	204	205
Suction Cup																
A				A	A	A	A	A	A	A	A	A	A	A	A	A
B		B									B	B	B	B	B	B
C														C	C	C
D			D						D	D	D	D	D	D	D	D
E			E				E	E	E	E	E	E	E	E	E	E
F							F	F	F	F	F	F	F	F	F	F

- Day 1 (December 14, 2012) – all suction cups adhered to flat section of windscreen.
- Day 42 - Suction cup B fell off windscreen. All suction cups had been exposed to rain, below freezing temps, etc.; however, suction cup B was the only suction cup to fall off at this time. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 52 - Suction cup D and E fell off windscreen after snowfall. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 133 - Suction cup A fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.

- Day 135 - Suction cup A fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 137 - Suction cup A fell off windscreen. This suction cup will not be reattached to windscreen due to entering of extreme AZ summer temperatures and the fact surface of the suction cup seems a bit slippery. This suction cup falling off at high outside temperature does not come as a surprise, as it failed temp testing at +55°C. This set-up is in direct sun; therefore, the surface temp will possibly be higher during hot outside temperatures.
- Day 138 - Suction cup D fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 151 - Suction cup F fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 173 - Suction cup F fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 174 – Suction cup F fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 180 – Suction cup E fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 181 – Both suction cups E & F fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 183 - Both Suction cups E & F fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- As of Day 183 (July 9, 2013), only suction cup C had not fallen off the windscreen.
- As of Day 183, the UV index continues to be extreme UV intensity of 11. This is significant in the fact that high UV and ozone levels tend to degrade rubber (of which the suction cup itself is made). UZ intensity of 11 has occurred since Day 145.
- Day 189 (July 15) – Suction cups D, E, and F fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 193 (July 19) - Suction cups D, E, and F fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 196 (July 22) - Suction cups B, D, E, and F fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 200 (July 26) - Suction cups B, D, E, and F fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 201 (July 27) - Suction cups B, D, E, and F fell off windscreen. Surface and suction cup were cleaned with isopropyl alcohol and reattached to windscreen.
- Day 202 (July 28) - All suction cups fell off windscreen

- Day 204 (July 30) - All suction cups fell off windscreen
- Day 205 (July 31) – All suction cups fell off windscreen. Experiment concluded.

All suction cups, at the conclusion of this test, showed permanent deformation in the rubber attachment area (look 'warped.'), and would not remain adhered to the windscreen for more than 1 day. In most cases in the last week of the test, the suction cups fell off every day. Possible causes of failures include extreme UV index of 11 or higher, temperature extremes, barometric pressure changes (monsoon season), etc. The results do show that in absence of extreme UV index and extreme high temperatures, with the exception of suction cup A and a few isolated failures, the suction cups stayed adhered quite well for approximately 6 months.

The recommendations from this test are:

- Suction cups must be adhered to a flat surface.
- Suction cups should not be left attached to the aircraft windscreen for long periods of time.
- The suction cups should be replaced every six months at a minimum; more often in extreme environments.

2.7 Aircraft Windscreen Cleanliness

It is important to understand the effect the cleanliness of a windscreen can have on the adherence of suction cups to the windscreen of an aircraft. Three sets of tests were designed to evaluate the hypothesis that the cleanliness of the windscreen surface will affect how well a suction cup adheres to it. One scenario involved the effects of surface cleaner itself, while two scenarios of a dirty windscreen were investigated: a dusty surface and an oily surface. This section discusses the tests conducted for each of these surface conditions.

Due to the high amount of vibration typically experienced by aircraft, it was determined that vibration tests would be the most obvious way of testing the adhesion of the suction cups to the windscreen for all of the aircraft windscreen cleanliness tests. Swept Sine vibration Curve R tests were chosen due to the low frequencies involved, which can induce extreme conditions (worst case) for the suction cups. Each of the three orthogonal axes of each suction cup temporary securing solution was subjected to the 2.5 g sinusoidal vibration requirement from 10 to 250 Hz of Curve R for one hour.

For the Sine Curve R tests, an accelerometer is placed on the suction cup, and the response of the suction cup during testing is measured by that accelerometer. The response of the suction cup is shown in black in each figure. The upper and lower limits of the acceptable range is shown in red (outside the acceptable range is considered fail). The suction cup response is shown in black and remained in the acceptable range. The response shown in green is located on the front face of the display / touch surface.

2.7.1 Effects of Surface Cleaner

The cleanliness of an aircraft windscreen will affect how well a suction cup adheres to it. Aircraft windscreens can be cleaned with a variety of cleaners. Common cleaners (found in many aircraft hangers) used for Plexiglas type windscreens are clear plastic cleaners, such as Meguiars© Mirror Glaze

Professional 17 Clear Plastic Cleaner (and other similar products). These types of plastic cleaners clean and condition the surface at the same time.

To provide some sort of metric with which to measure the effectiveness and any deleterious affect (possibly from residue) aircraft windscreen cleaners might have on adherence of suction cups, vibration tests were conducted on suction cups B, C, D, E and F.

The methodology used for these tests follows:

1. Clean windscreen with aircraft wind screen cleaner (Meguiars© Mirror Glaze Professional 17 Clear Plastic Cleaner).
2. Clean suction cup with isopropyl alcohol.
3. Attach PED suction cup to windscreen.
4. Run through all axis of Swept Sine Curve R vibration test.

A representative Sine Swept vibration test report from these tests is shown in Figure 26. Suction cups B, C, D, E, and F passed.

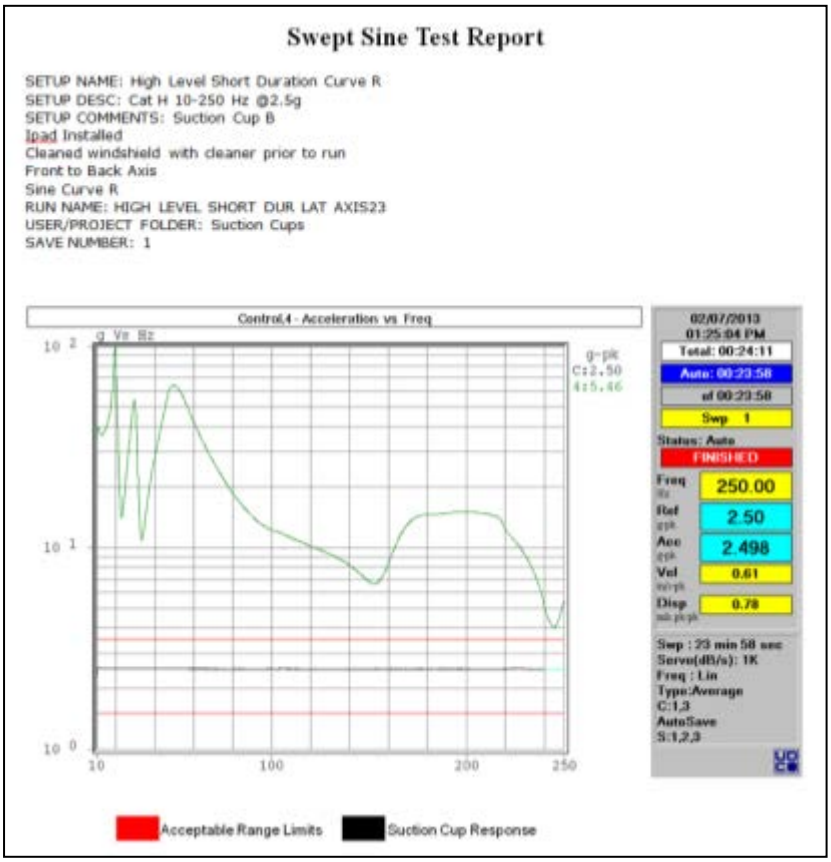


Figure 26. Sine Curve R – Surface Cleaner Experiment (Suction Cup B shown)

As can be seen in Figure 26 above, the response stayed within acceptable range (upper and lower limits bounded in red), and passed the test. Since what was being tested was the integrity and reliability of the suction cup (shown in black), this temporary securing solution passed this test.

2.7.2 Effects of Dust

Dusty and dirty surfaces can be caused from a variety of environmental sources (pollution, dust in air, etc). In particular, in the case of dust storms, as seen in the Southwest, dust can play havoc with cleanliness of surfaces, especially if there are any access points for the dust to get into the interior of the flight deck and onto the inside of the windshield or side windows.

A test was devised wherein the windscreen interior surface was subjected to a simulated extreme dust condition to examine the effects of a dirty / dusty windshield on the adherence of suction cups. The C182 windscreen was subjected to dirt by placing the surface of the windscreen in very fine dust to create a dusty windshield before attaching suctions cups B, C, D, E and F. After attaching the suction cups to the dusty windscreen surface, Sine Curve vibration testing commenced. We chose the Swept Sine vibration Curve R tests for the tests due to the low frequencies involved in the test, as these low frequencies can induce extreme conditions (worst case) for temporary securing solutions.

The methodology used for these tests follows. Each suction cup was tested individually.

1) Clean suction cup attachment area with isopropyl alcohol.
2) Before testing each suction cup, dust the plastic windshield by placing the surface of the windscreen on the lab vacuum filter as shown in setup photograph in Figure 27.
3) Tap the edge of the windshield two times on a table top to remove excess dust.
4) Attach the windscreen to the vibration fixture, as shown in Figure 28.
5) Run through all axis of Sine Curve R.

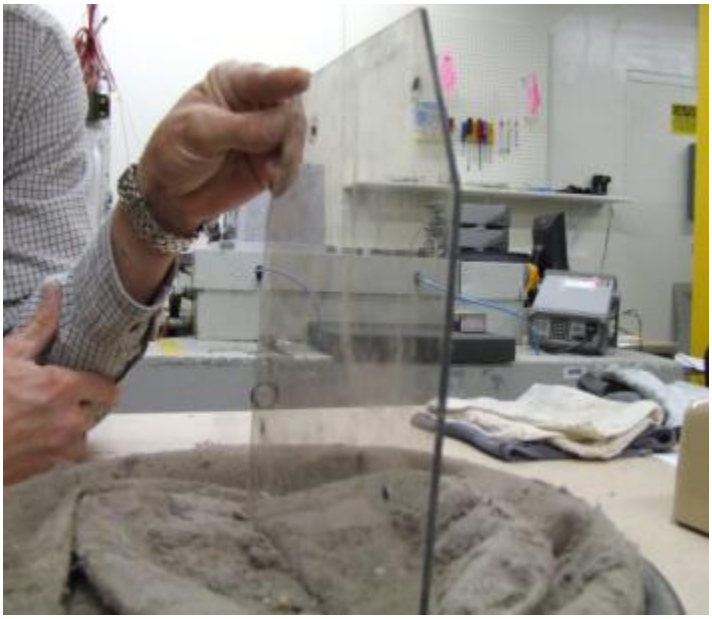


Figure 27. Dusty Windscreen Test

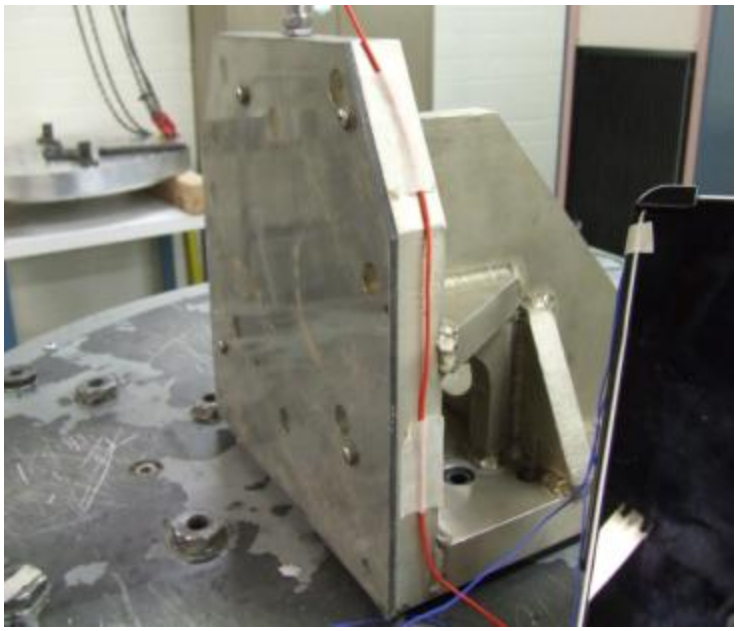


Figure 28. Dusty Windscreen Test Setup on Vibration Table

All of the suction cups fell off before the test ended. Suction cups B, C, D, and F did not make it through 1 axis of vibration; Suction cup E passed one axis of Sine Curve R before falling off. See Appendix A for test notes, etc. The results highlight the importance of cleaning the interior of windscreens / windshields / mounting surfaces to ensure proper adherence of the suction cup type of PED securing solution.

2.7.3 Effects of Oil

Oil from fingerprints is another way windscreens may become dirty, smudged, and grimy. Many types of oil can exist on a person's fingers. Examples that affect the composition of oily fingerprints include natural skin oils, sweat, medications, lotions, and oil from food, etc. If the surface of the windscreen is oily (e.g., from being touched by oily fingers), the suction cup may not adhere well to the windscreen.

A test was devised wherein the windscreen interior surface was subjected to oily fingerprint conditions to examine the effects of an oily windshield on the adherence of PED suction cup temporary securing solutions. We conducted Sine Curve vibration testing on suction cups B, C, D, E, and F. Each suction cup was tested individually. The methodology used for each test follows:

1. Clean suction cup with isopropyl alcohol.
2. Clean windscreen with isopropyl alcohol to ensure testing of only the effect of the oily surface.
3. Apply oily fingerprints to C182 windscreen by touching food with high oil content with fingers and then touching the windscreen with the oily fingers (see Figure 29)
4. Attach windscreen to vibration fixture.
5. Attach suction cup to windscreen.

6. Run through all axes of Sine Curve R vibration tests.

A representative Sine Curve R plot from these tests is shown in Figure 30. As can be seen from the figure, the response stayed within acceptable range (upper and lower limits bounded in red), and passed the test.

Suction cups B, C, D, E and F all adhered to the surface through the duration of the vibration testing. We believe that the oil may have ‘conditioned’ the windscreen (e.g., by filling in small scratches or pores), which allowed good adherence to the surface.

Figure 29. Oily Fingerprint Test

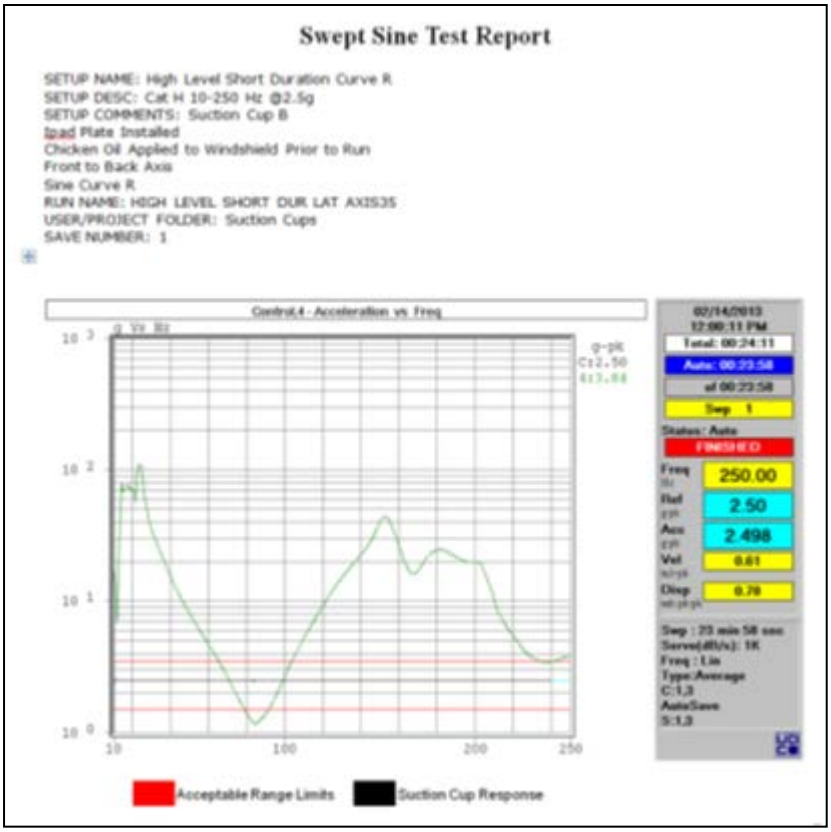


Figure 30. Sine Curve R – Oily Surface Experiment (Suction Cup B shown)

2.8 Effects of Painted Surface

There may be areas in the flight deck where a PED suction cup securing solution might be mounted to a painted surface. Powder coated metal (a painting process where material is baked on at high temperatures, thus making it more durable) is typical of most painted metal surfaces found on the flight deck. Thus, we wanted to examine the effect such a surface might have on suction cup adhesion.

Sine Curve R vibration tests were conducted on suction cups B, C, D, E, and F to examine the adherence and integrity of PED suction cups to powder coated metal. Sine Curve R was chosen because this causes the worst-case vibration conditions. The methodology used for these tests, in which each suction cup was tested independently, is shown here:

1. Clean painted surface with isopropyl alcohol.
2. Clean suction cup with isopropyl alcohol.
3. Attach suction cup PED securing solution to painted surface which has been mounted onto the vibration fixture.
4. Run through all axis of Sine Curve R. Each of the three orthogonal axes of each suction cup securing solution was subjected to the 2.5 g sinusoidal vibration requirement from 10 to 250 Hz of Curve R for one hour.

Figure 33 shows an example of a suction cup mounted to a painted surface for testing. A representative Sine Curve R plot from these tests is shown in Figure 34. In this test the accelerometer response, shown in black, is placed on the suction cup. As can be seen in Figure 34, the response stayed within acceptable range (upper and lower limits bounded in red), and passed the test. The response shown in

green is located on the front face of the display. Since what was being tested was the integrity and reliability of the suction cup (shown in black), this securing solution passed this test.

All suction cups tested (B, C, D, E and F) adhered to the surface for the duration of the test and, therefore, passed the test.

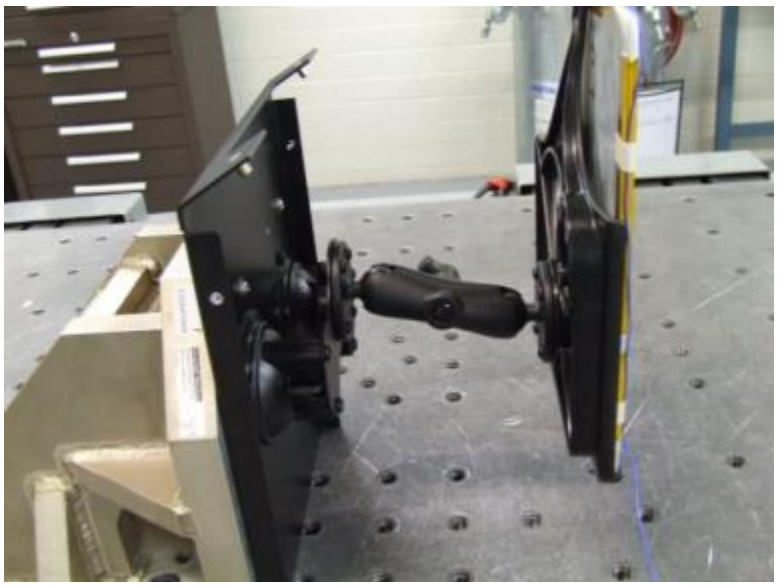


Figure 31. Painted Surface Experiment (Suction Cup F shown)

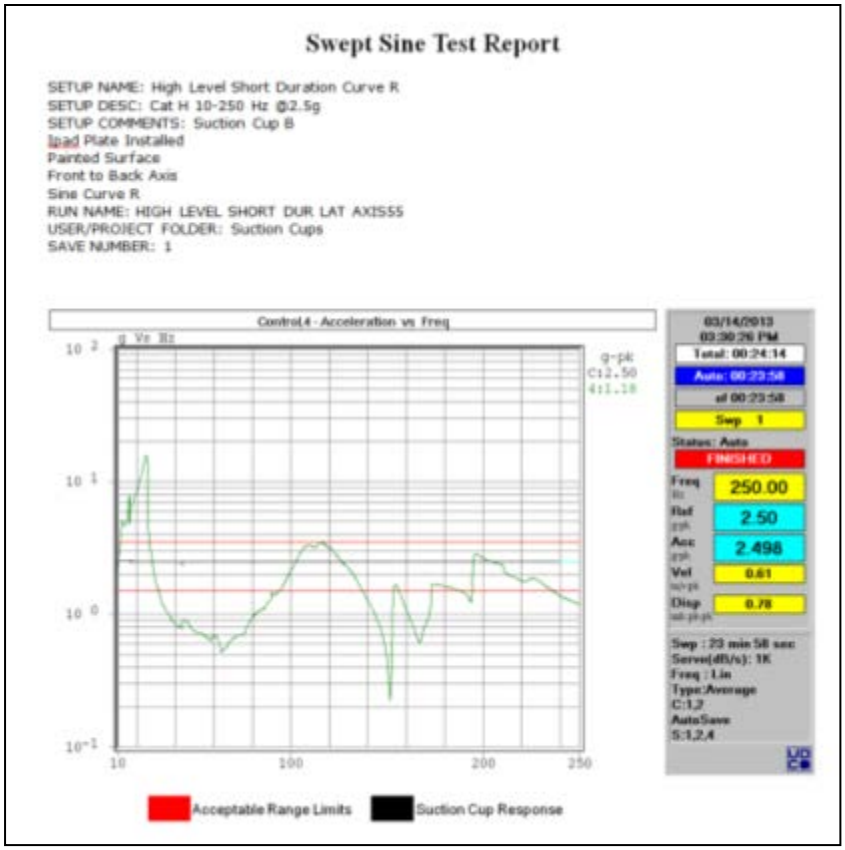


Figure 32. Sine Curve R – Painted Surface Experiment (Suction Cup B shown)

2.9 Effects of Turbulence

We were interested in ensuring that suction cups would remain adhered during turbulence, especially while the PED was being used. In typical use, during turbulence, it is expected the pilot would be holding onto the PED for hand stabilization, while also inputting data into the user interface. Holding onto the PED to stabilize potentially adds additional forces which could possibly increase the chance of detachment during turbulent conditions. These tests were conducted as part of a separate test, to allow testing of the suction cup as well as yoke securing solutions, under moderate turbulence, while being used.

This test was carried out using the Crew Interface Motion System (CIMS), which can produce and present motion /accelerations representative of moderate flight deck turbulence (see Figure 35). The moderate random turbulence used on the motion simulator was 1.5 - 2.0g. Table 11 shows the motion simulator range and speed of movement used during the Moderate Turbulence profile.

Figure 36 shows the various locations where the securing solutions were mounted on the simulator. The suction cups were attached to a portion of an actual C182 aircraft windscreen, which was anchored to the simulator frame for stability (see Figure 37 and Figure 38). Also shown is the yoke securing solution. Suction cups B, C, D, E, and F had no signs of detachment or weakened structures due to turbulence vibrations.

Figure 33. Crew Interface Motion System (CIMS

Table 11. Range of Excursions, Accelerations and Velocities for CIMS

Excursions	Accelerations	Velocities
± 30° pitch	1,000°/sec^2	35°/sec
± 35° roll	1,000°/sec^2	35°/sec
± 45° yaw	1,000°/sec^2	35°/sec
± 14" heave	2.0g	18"/sec
± 17" surge	2.0g	18"/sec
± 18" sway	2.0g	18"/sec

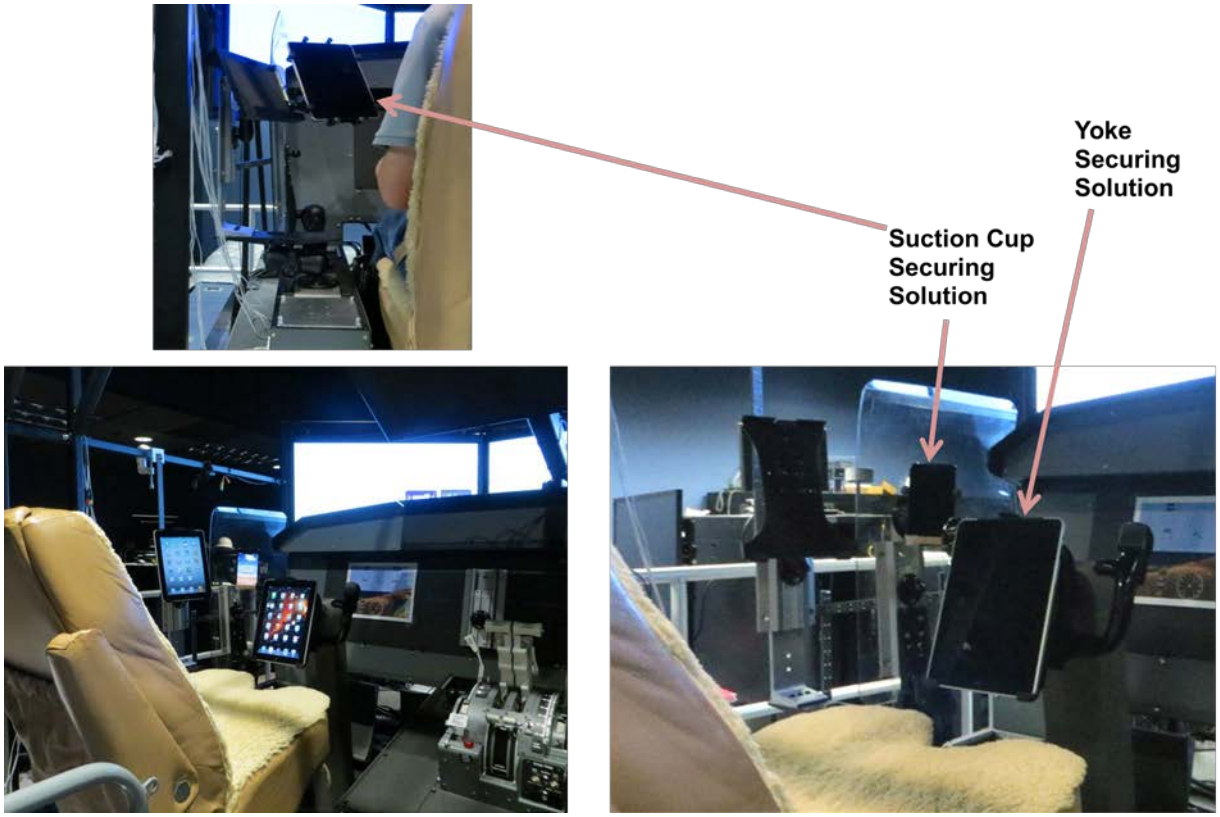


Figure 34. Overview of Mounting Locations with Securing Solutions in Place

Figure 35. Suction Cup Securing Solution Attached to a Windscreen and Anchored to the Simulator – Large Display Attached

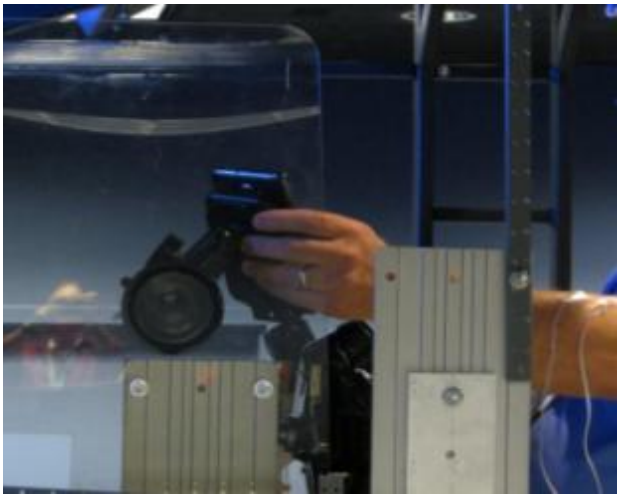


Figure 36. Suction Cup Securing Solution Attached to a Windscreen and Anchored to the Simulator – Medium Display Attached

2.10 Summary of Environmental Tests

In general, Suction Cups B, C, D, E, and F passed the environmental tests. Table 12 shows a high-level summary of tests conducted and results thereof.

Table 12. Summary of Environmental Test Results

TEST	CAT	Suction Cup Securing Solution						C182 Wind-screen	C560 Storm Window	SUMMARY	RESULTS
		A	B	C	D	E	F				
Temp.	A B	F	P	P	P	F	P		X	Operating: -20°C to +55°C Short Term Operating: -40°C to +70°C Survival: -55°C / +85°C	'A' FAILED @ 55°C 'E' Failed at 85°C
Altitude (K-ft)	A B	na	27	27	27	27	27	X		Altitude: 16.8 k-meters (55 k-ft) Overpressure: -4.6 k-meters (-15 k-ft) Decompression: 16.8 k-meters (55 k-ft)	Suction Cups B, C, D, E, F all survived to 27K ft and fell off. Repeated test 3 times with similar results. Overpressure and decompression were not run due to these results (decided 3-20-13).
Temp. Variation	B	na	P	P	P	P	P		X	5°C/Minute	Suction Cups B, C, D, E, F passed
Humidity	B	na	P	P	P	P	P	X		10-Cycles with 1 Cycle/24 Hours 65°C @ 95±4% RH for 6 Hrs each cycle Transition to 38°C @ >85% RH	Suction Cups B, C, D, E, F passed
Operational Shock & Emergency Landing	B	na	P	P	P	P	P	X		Operational 6G, 11ms & 20ms, 3 Pulses each direction CFR 25.561: 9G	Suction Cups B, C, D, E, F passed
Vibration	S H	F	P	P	P	P	P	X		Random Curve C Sinusoidal Curve R	Suction Cups B, C, D, E, F passed
Sunlight/UV Exposure		Started 12-14-12 *If cup falls off, clean windscreen and cup with isopropyl alcohol and reapply Concluded 7-31-13						X		Direct Exposure to AZ Sun	Day 42 - B fell off Day 52 - D & E fell off after snowfall Day 133 -137- A fell off each day Day 138 -D fell off Day 151, 173,178 - F fell off Numerous failures continued. See Table 10
Effects of Surface Cleaner		na	P	P	P	P	P	X		Wind Screen cleaned with aircraft wind screen cleaner, suction cup mounted, then put through all axis of Sine Curve	Suction Cups B, C, D, E, F passed
Effects of dusty windshield		na	F	F	F	F	F	X		Wind screen subjected to dirt to create dusty wind shield, then put through all axis of Sine Curve	All units FAILED
Effects of oily windshield		na	P	P	P	P	P	X		Wind screen subjected to chicken finger oil to create oily wind shield, then put through all axis of Sine Curve	Suction Cups B, C, D, E, F passed
Effects of Painted Surface		na	P	P	P	P	P	X		Run 3 axis of Sine Curve	Suction Cups B, C, D, E, F passed
Effects of Turbulence		na	P	P	P	P	P	X		Moderate Random Turbulence on motion simulator 1.5 - 2.0G	Suction Cups B, C, D, E, F passed

3 Conclusions and Recommendations

In conclusion, the yoke securing solution as well as most suction cup temporary securing solutions have passed vigorous environmental assessments per RTCA DO-160F requirements. For the most part, the temporary securing solutions tested in this project are judged to be safe from an environmental perspective with some exceptions. In some conditions, such as exposure to high pressure altitudes, improperly prepared surfaces, or if the surfaces are not flat, the suction cups could fall off and cause damage to themselves or other equipment.

The following recommendations are highly suggested when using portable electronic devices with suction cup temporary securing solutions:

- The suction cups and surface to which they will be attached should be properly cleaned with isopropyl alcohol or aircraft window cleaner prior to attachment.
- Attachment surfaces should be substantially smooth and flat.
- Periodic cleaning & re-attachment should be performed as appropriate for conditions of environment in which they are in (dusty, etc.).
- Suction cups should not be left attached to the aircraft windscreen for long periods of time.
- The suction cups should be replaced every six months at a minimum; more often in extreme environments.

4 References

Chandra, D.C., Yeh, M., Riley, V., Mangold, S.J. (2003). Human Factors Considerations in the Design and Evaluation of Electronic Flight Bags (EFBs) (v2). US Department of Transportation, Office of Aviation Research, Washington, DC.

FAA (2012). Aircraft Equipment and Operational Authorizations (Vol. 4), Chapter 15: Electronic Flight Bag Authorization for Use – Section 1: Electronic Flight Bag Operational Authorization Process (8900.1 CHG 47). Federal Aviation Administration, Washington, DC.

FAA (2006). Electronic Flight Bag Job Aid (N 8200.98). Federal Aviation Administration, Washington, DC.

FAA (2012). Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags (AC 120-76B). Federal Aviation Administration, Washington, DC

Appendix A: Environmental Test Results

In each of the vibration test profiles in this appendix, an accelerometer is placed on the suction cup, and the response of the suction cup during testing is measured by that accelerometer. The responses shown in each profile are defined by the following:

Black - the response of the suction cup

Red - the upper and lower limits of the acceptable range is shown in red (outside the acceptable range is considered fail)

Green - the response shown in green (shown on Random and Sine curve profiles) is located on the front face of the display / touch surface, and was taken for reference only

Vibration

VIBRATION EQUIPMENT

1) SHAKER

TYPE: UNHOLTZ-DICKIE
MODEL: R30
S/N: 211
HAS: A11780A
DUE CAL: N/A

2) CONTROLLER

TYPE: Unholtz-Dickie
MODEL: Vwin II
S/N: 10013987
Asset: ID24164
DUE CAL: 2 May 2013
CAL'd 2 May 2012

3) SIGNAL CONDITIONER

TYPE: Unholtz-Dickie
MODEL: CVA-8
HAS: ID24163
DUE CAL: 8 Feb 2014
CAL'd 8 Feb 2013
TYPE: Unholtz-Dickie
MODEL: CVA-8
HAS: A13350A
DUE CAL: 26 Nov 2013
CAL'd 26 Nov 2012

ACCELEROMETERS

CONTROL
TYPE: ENDEVCO
MODEL: 2224C
S/N: DD56
ID: ID 4408

CAL'D	25 Oct 2012
DUE CAL:	25 Oct 2013

CONTROL

TYPE:	ENDEVCO
MODEL:	2224C
S/N:	CQ57
ID:	ID4780
CAL'D	4 Dec 2012
DUE CAL:	4 Sep 2013

RESPONSE

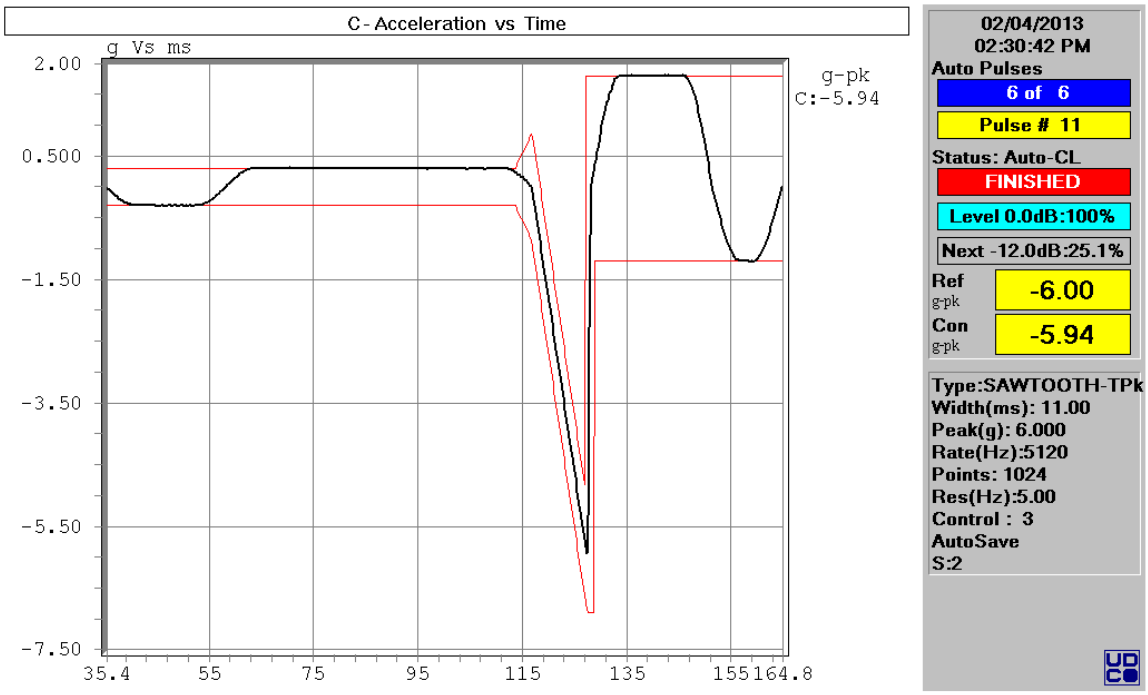
TYPE:	PCB
MODEL:	357C10
S/N:	10238
HAS:	ID 20970
CAL'D:	11 Sep 2012
DUE CAL:	11 Sep 2013

Suction Cup A

Suction Cup A - Front to Back Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report
SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Suction Cup A
Op Shock 6 G's 11 ms
Front to Back Axis
RUN NAME: run20
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 3
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

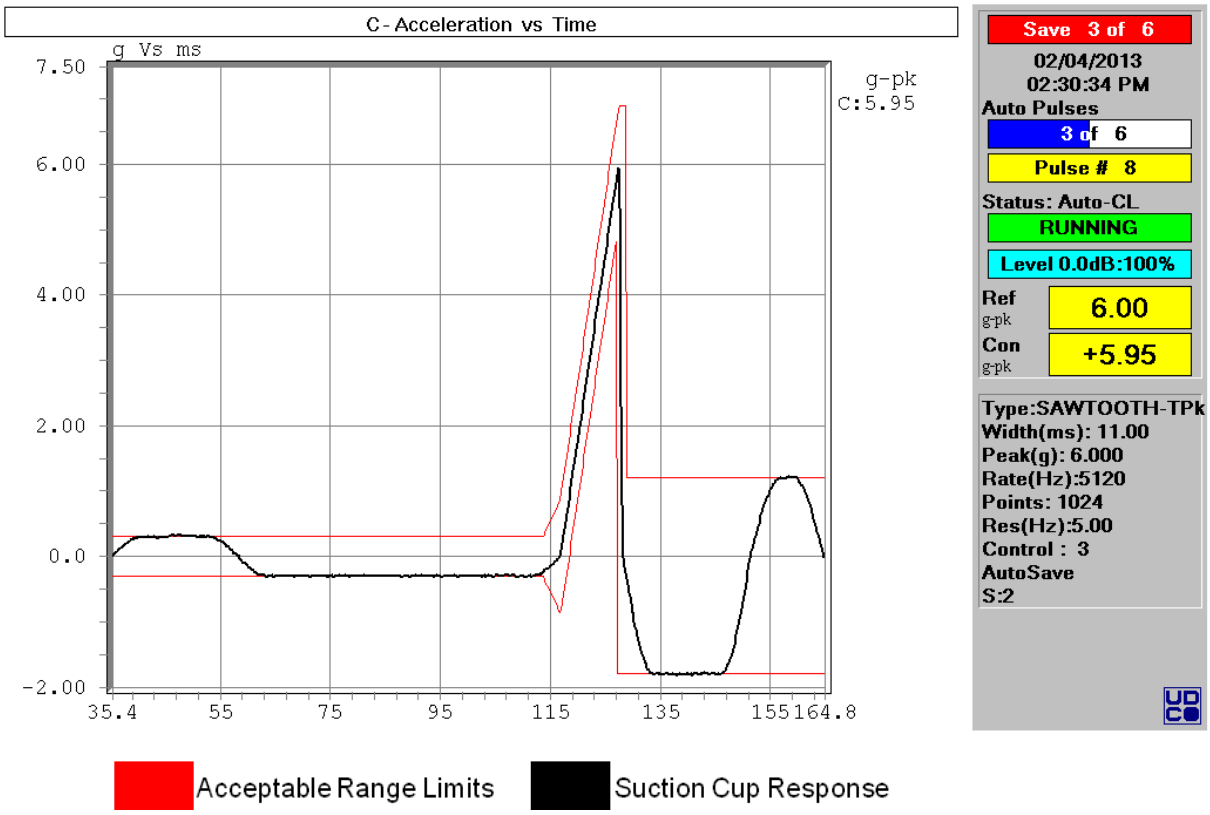
Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse:
Classical Shock Test Report
SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Suction Cup A
Op Shock 6 G's 11 ms
Front to Back Axis
RUN NAME: run20
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 3
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

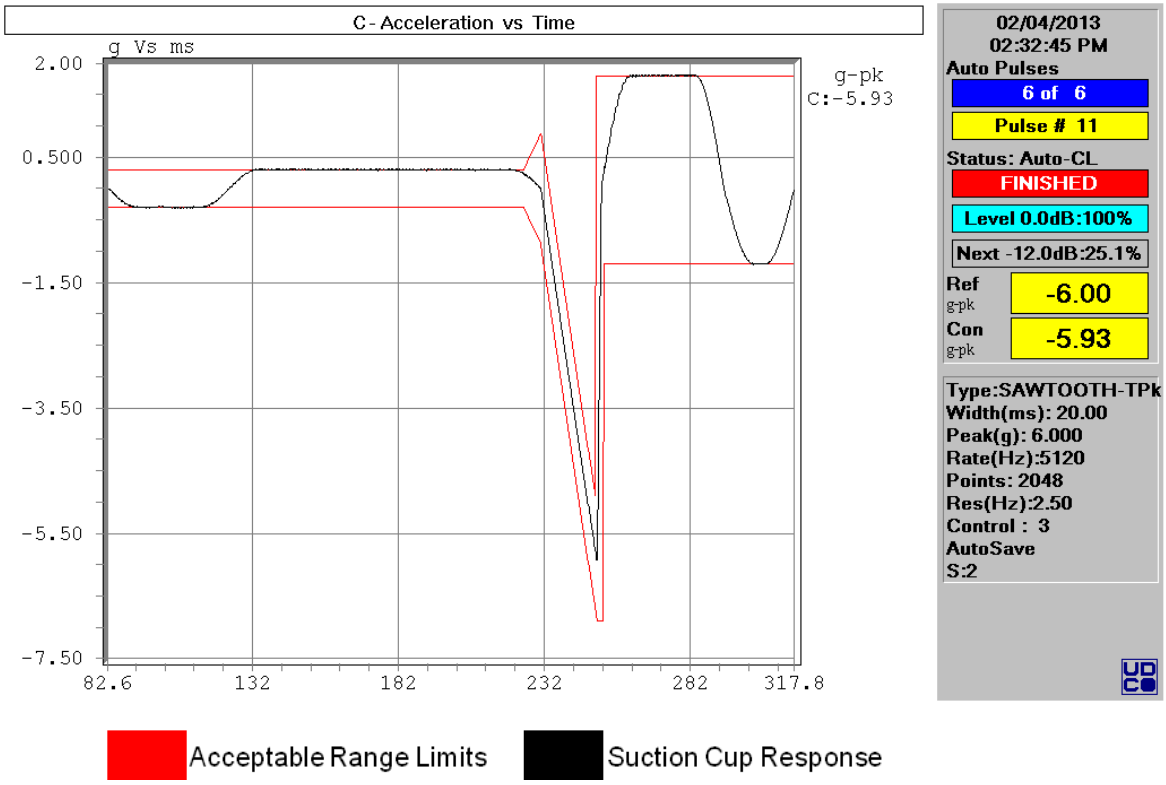
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Suction Cup A
Side to Side Axis
Op Shock 6 G's 20 ms
RUN NAME: run20
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 3
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

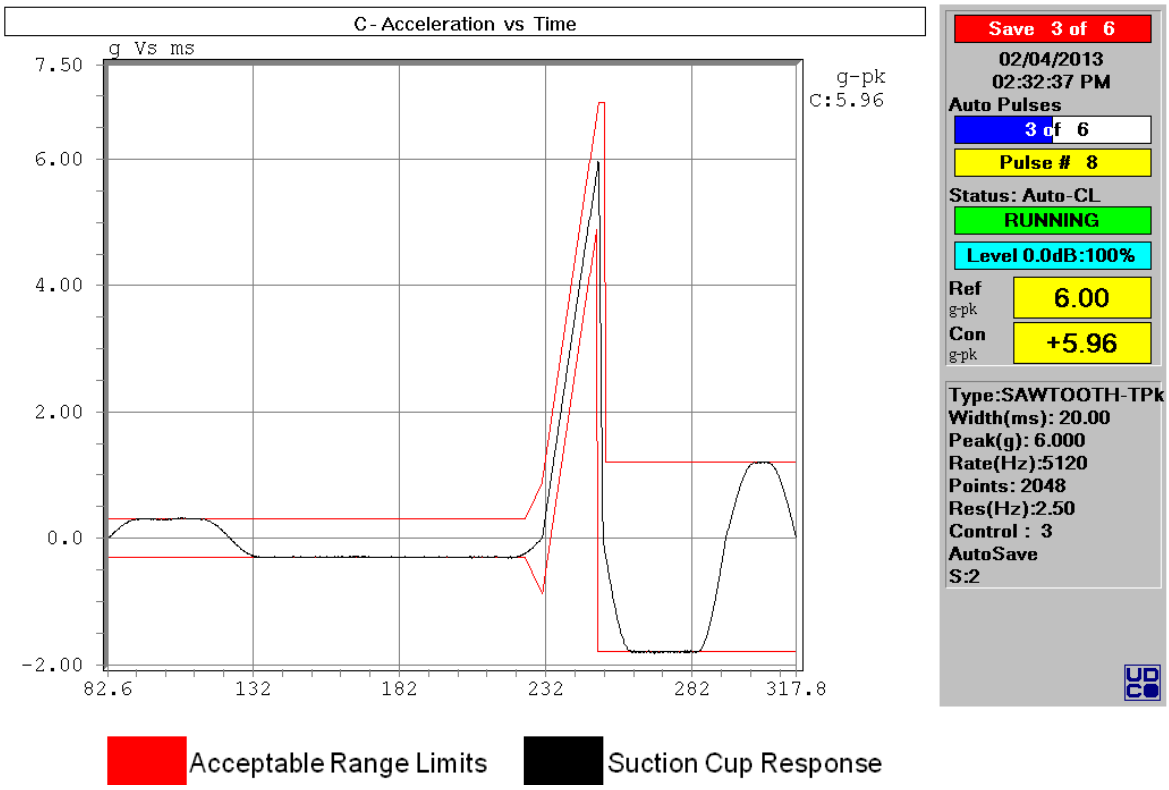
LEVEL STEP SEQUENCE

Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse:

Classical Shock Test Report
SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Suction Cup A
Side to Side Axis
Op Shock 6 G's 20 ms
RUN NAME: run20
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 3
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

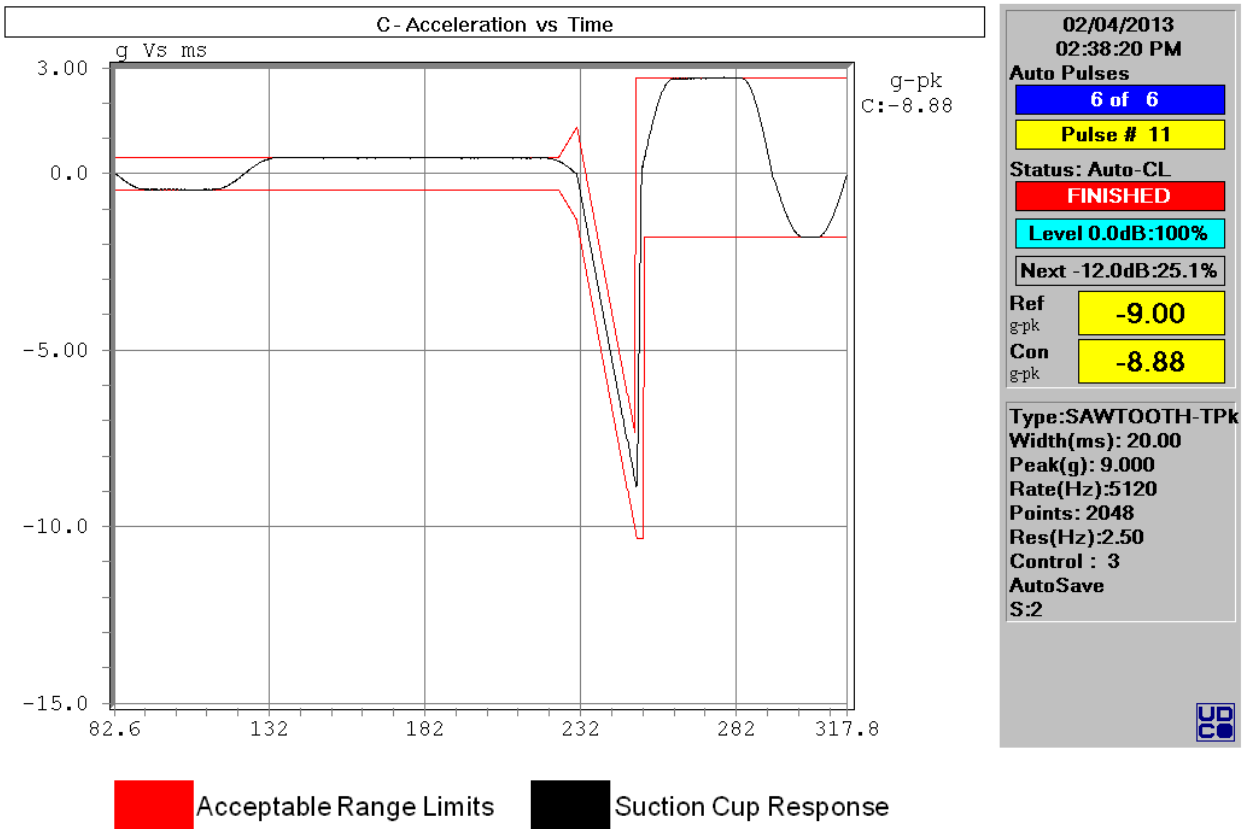
TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

9G's 20ms, Negative Pulse

Classical Shock Test Report
SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Suction Cup A
Side to Side Axis
Op Shock 9 G's 20 ms
RUN NAME: run21
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 3
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 9.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

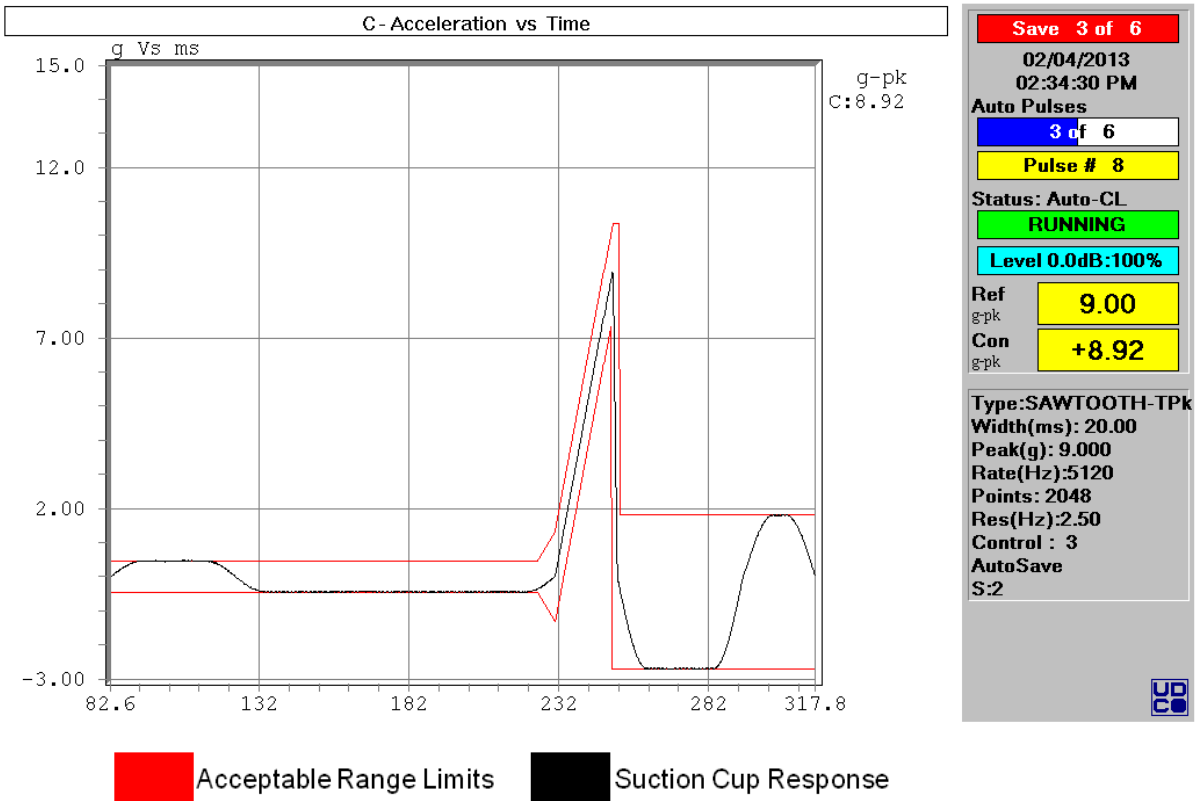
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

9G's 20ms, Positive Pulse:

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Suction Cup A
Side to Side Axis
Op Shock 9 G's 20 ms
RUN NAME: run21
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 3
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 9.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

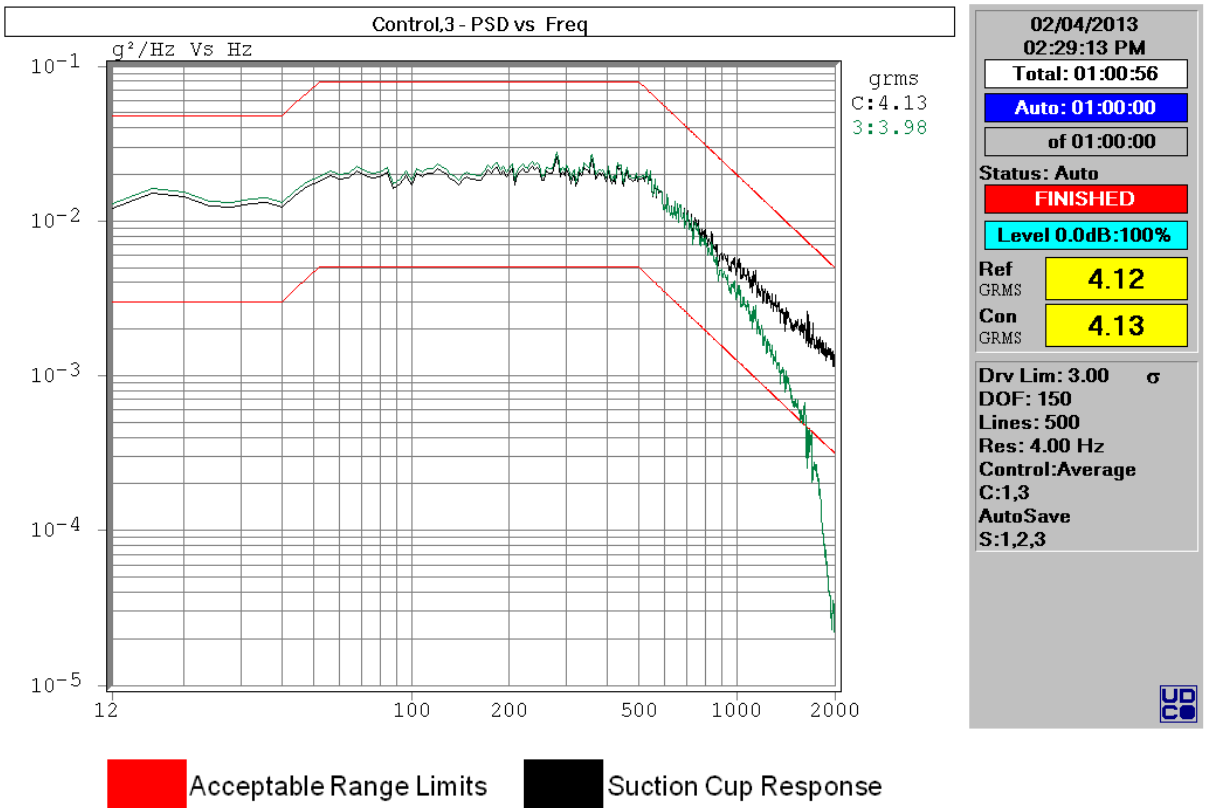
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup A
Dummy Load IPad Installed
Front to Back Axis
Random Curve C
RUN NAME: run15
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

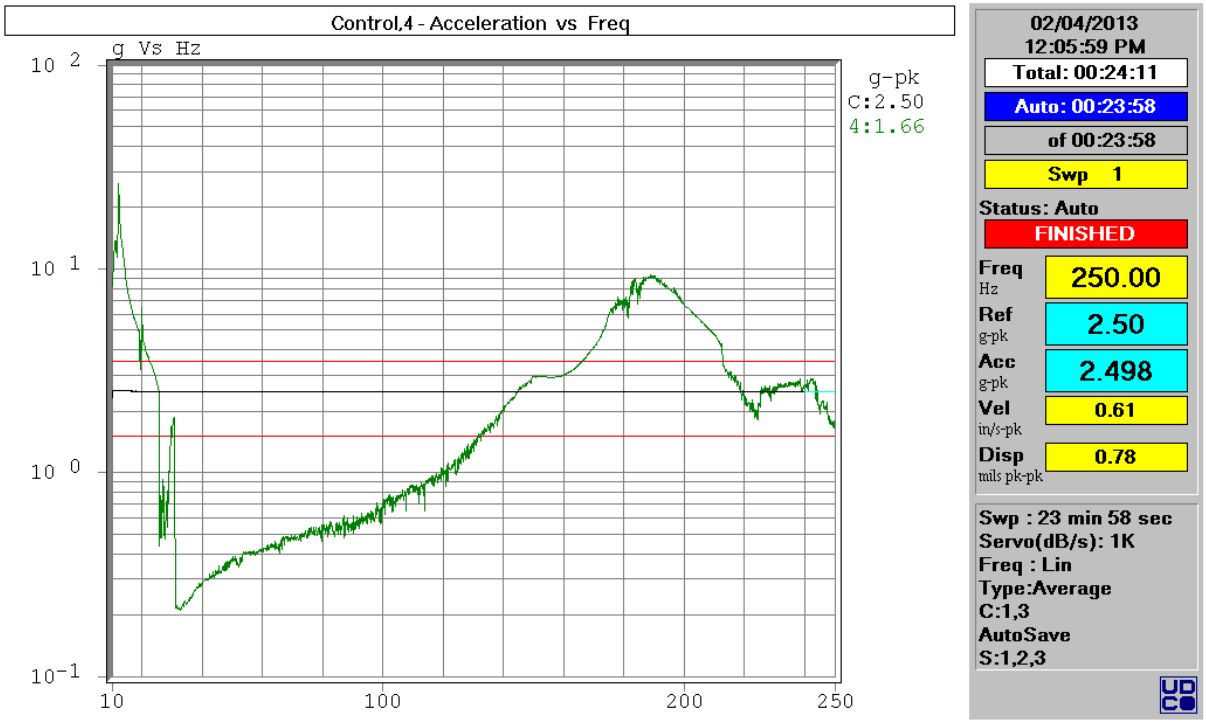
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup A
Dummy Load for IPad Installed
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS15
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

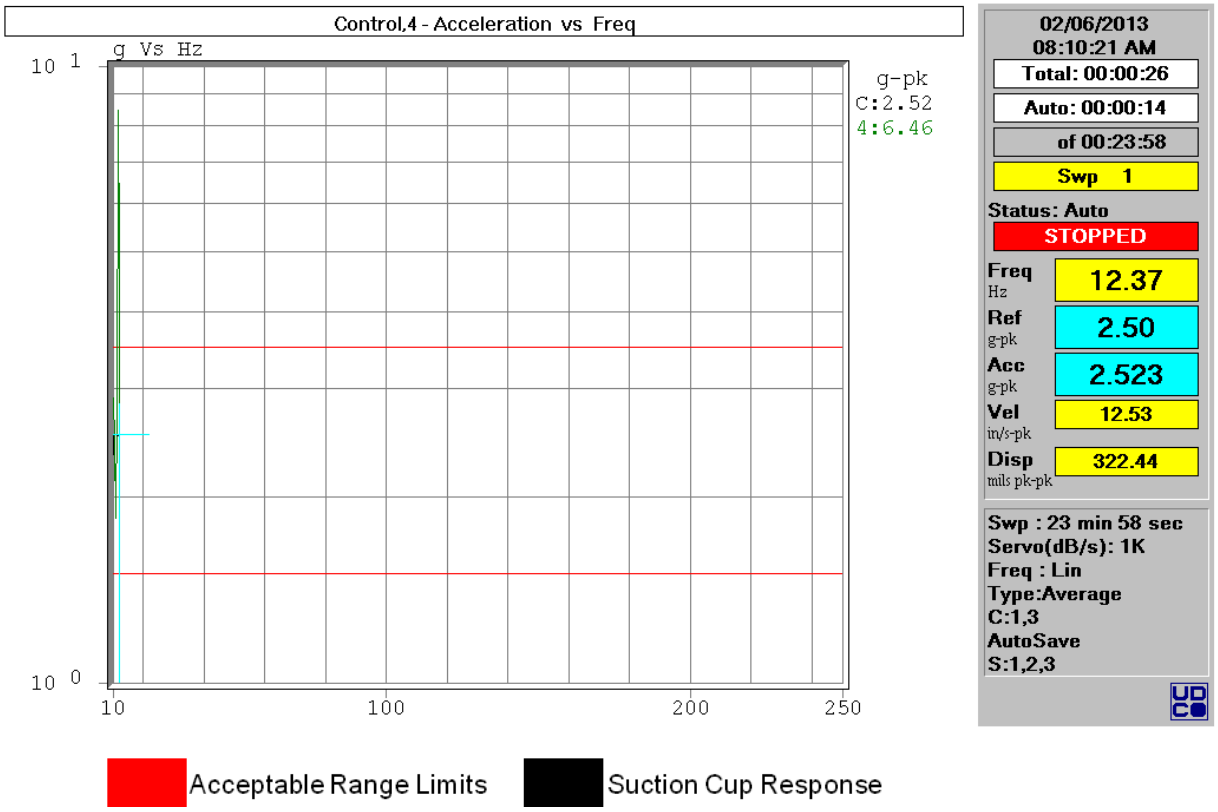
UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup A - Side to Side Axis

Swept Sine Test Report

FAILED TEST

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup A
Dummy Load for IPad Installed
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS16
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup A - Vertical Axis

Due to failure in Side to Side axis, as well as prior failures in temperature testing, this suction cup was not run through further tests.

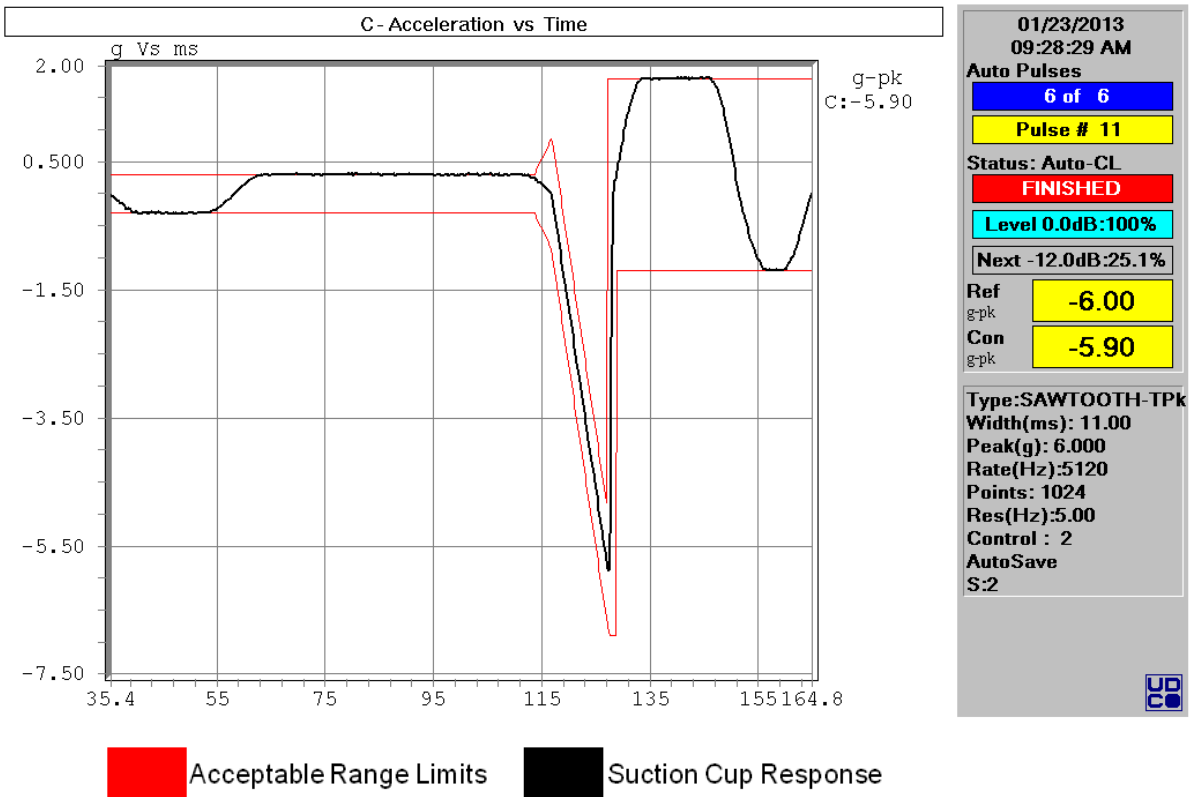
Suction Cup B

Suction Cup B – Front to Back Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup B
Op Shock 6 G's 11 ms
RUN NAME: run13
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

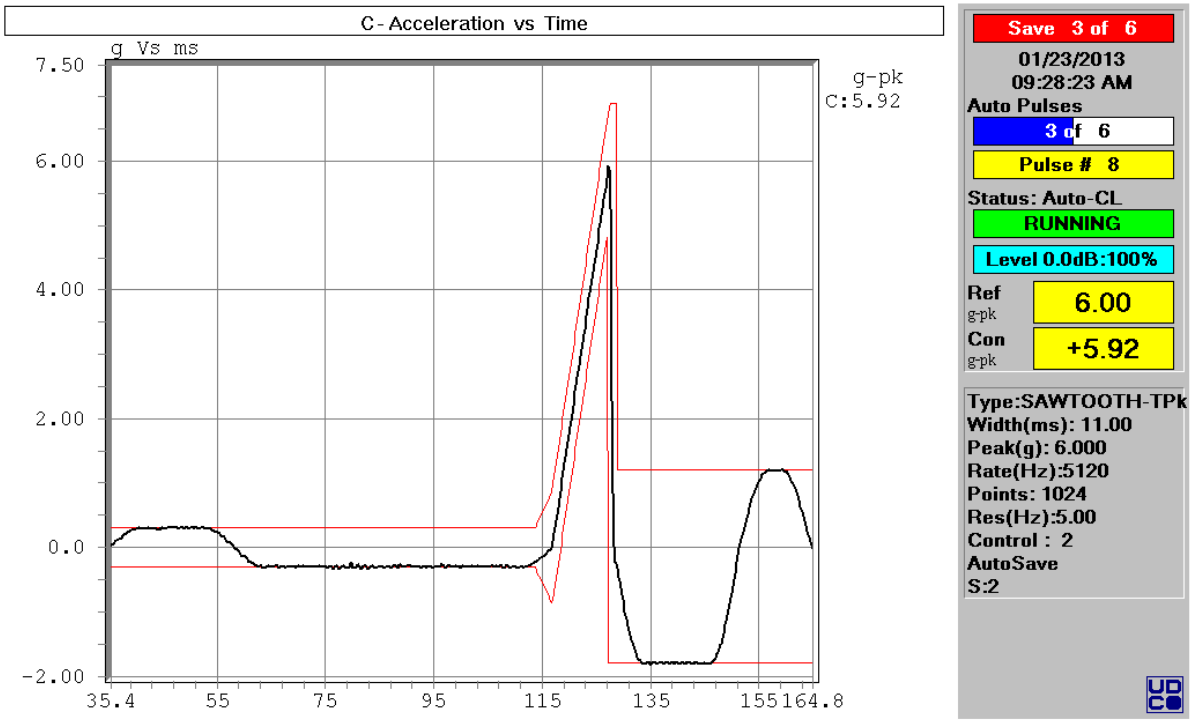
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup B
Op Shock 6 G's 11 ms
RUN NAME: run13
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

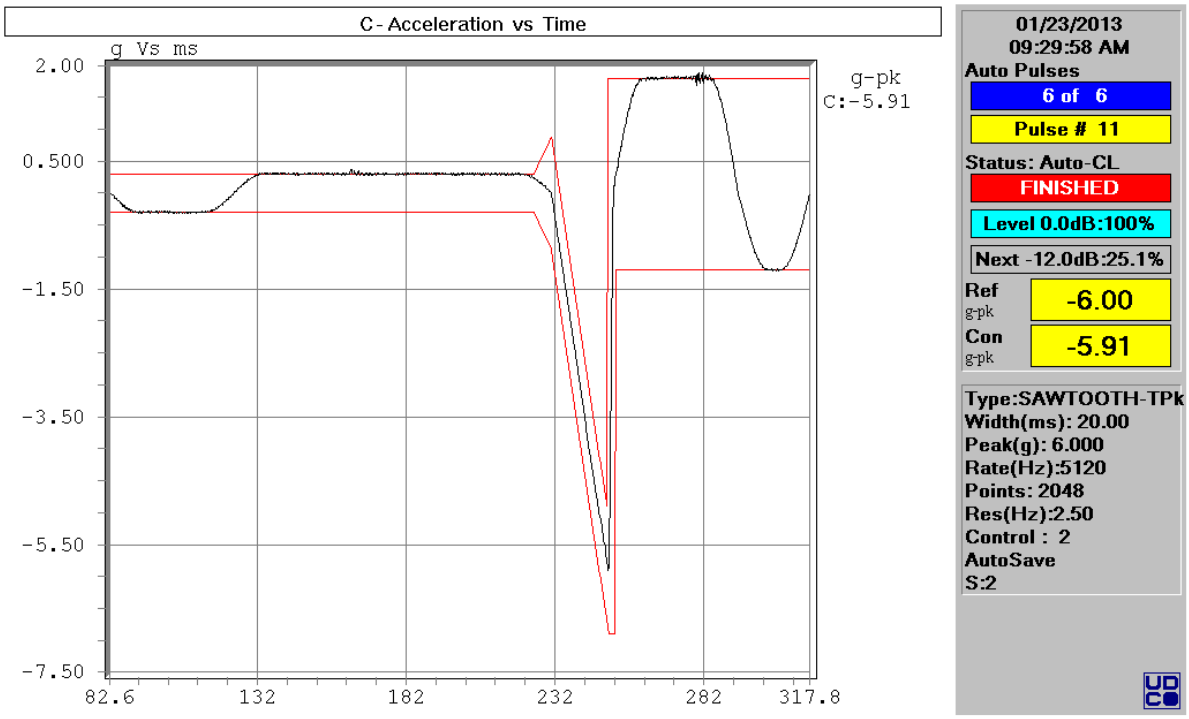
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup B
Op Shock 6 G's 20 ms
RUN NAME: run6
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

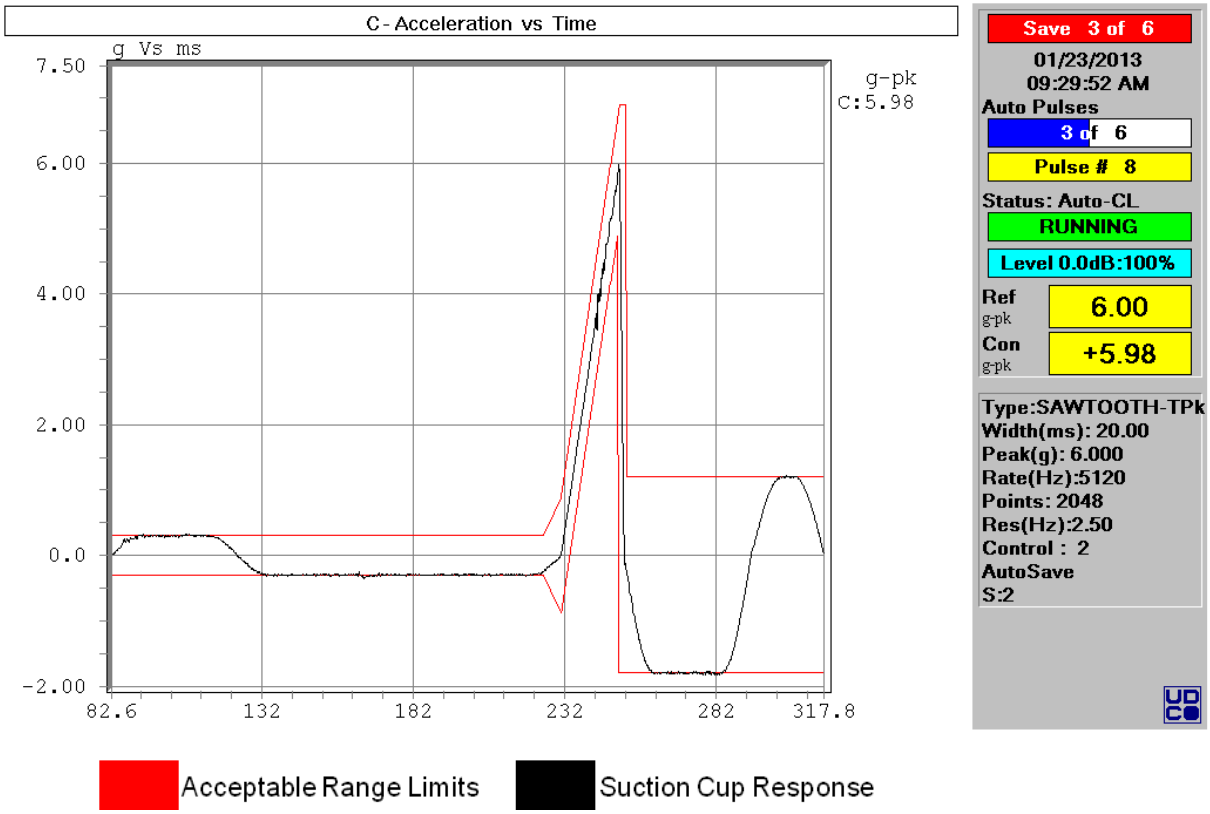
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup B
Op Shock 6 G's 20 ms
RUN NAME: run6
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

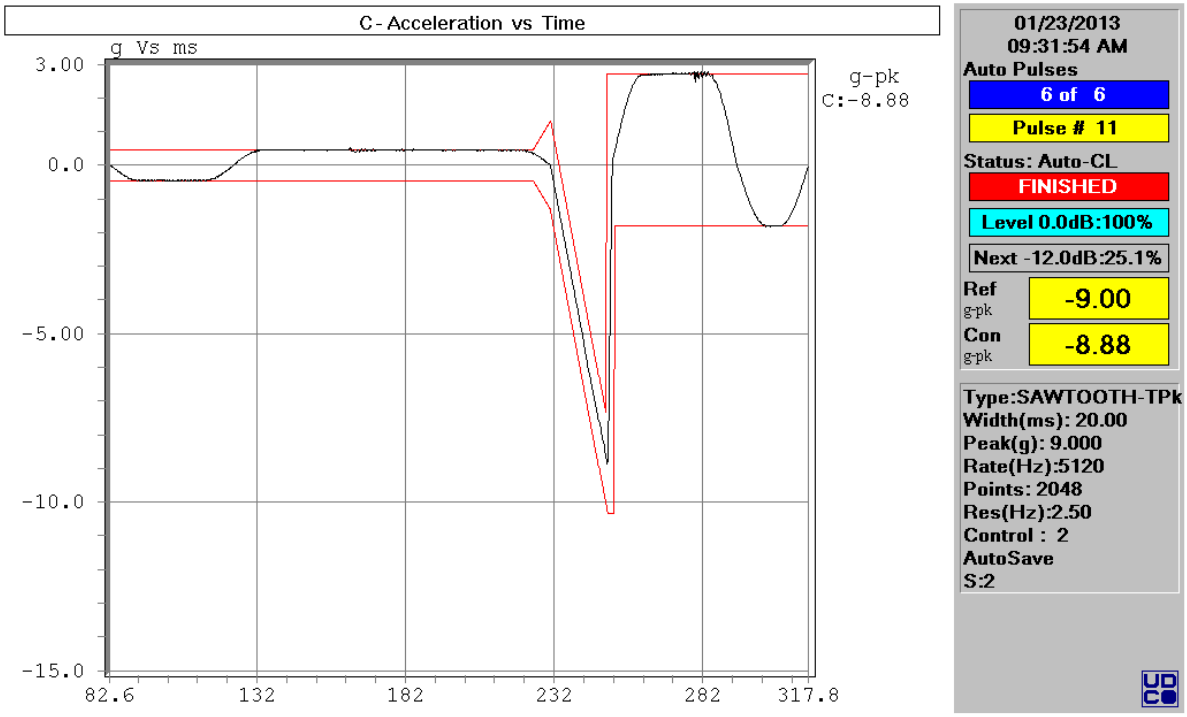
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

9G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup B
Op Shock 9 G's 20 ms
RUN NAME: run7
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 9.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

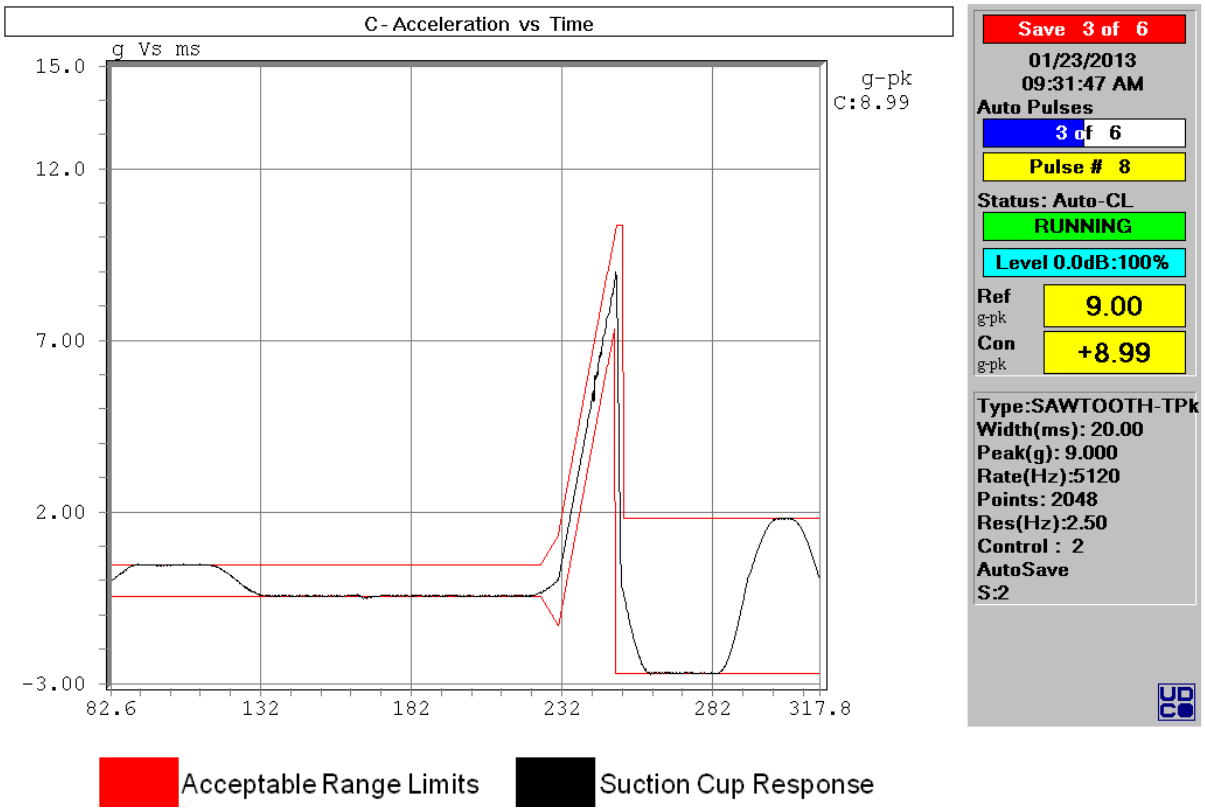
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

9G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup B
Op Shock 9 G's 20 ms
RUN NAME: run7
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 9.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

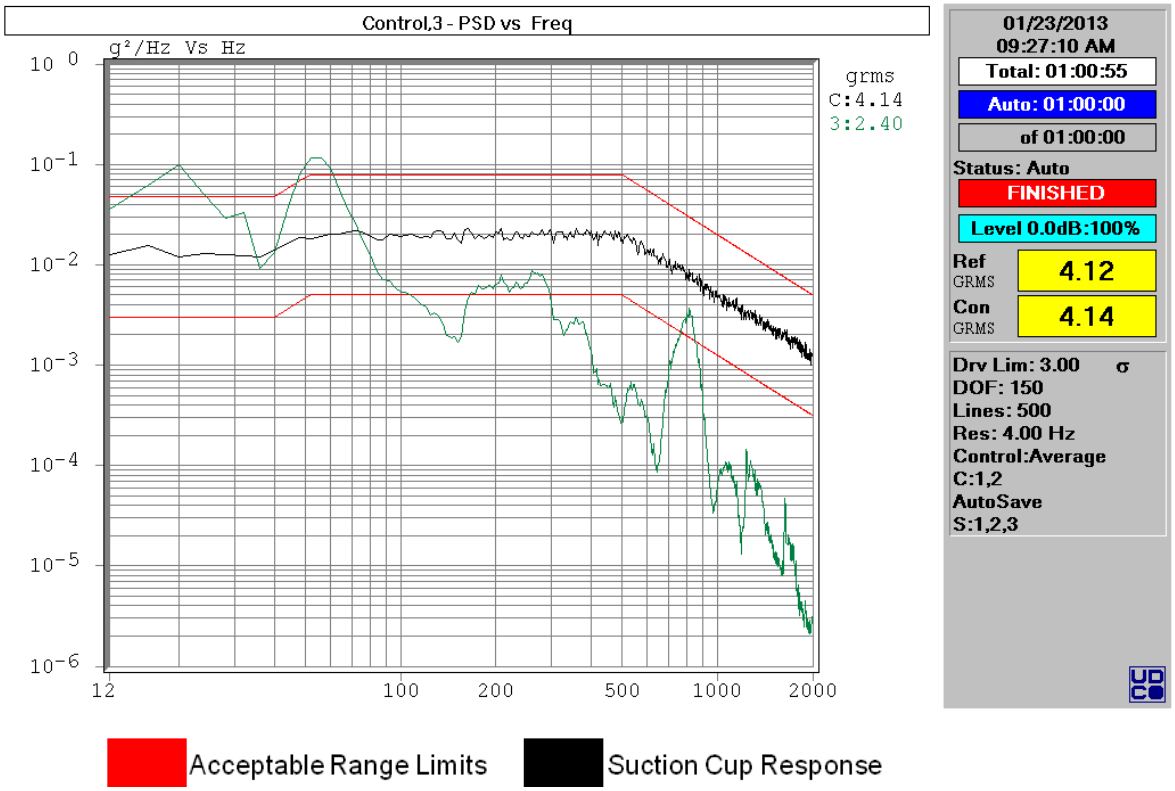
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup B
IPad installed
Front to Back Axis
Random Curve C
RUN NAME: run8
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

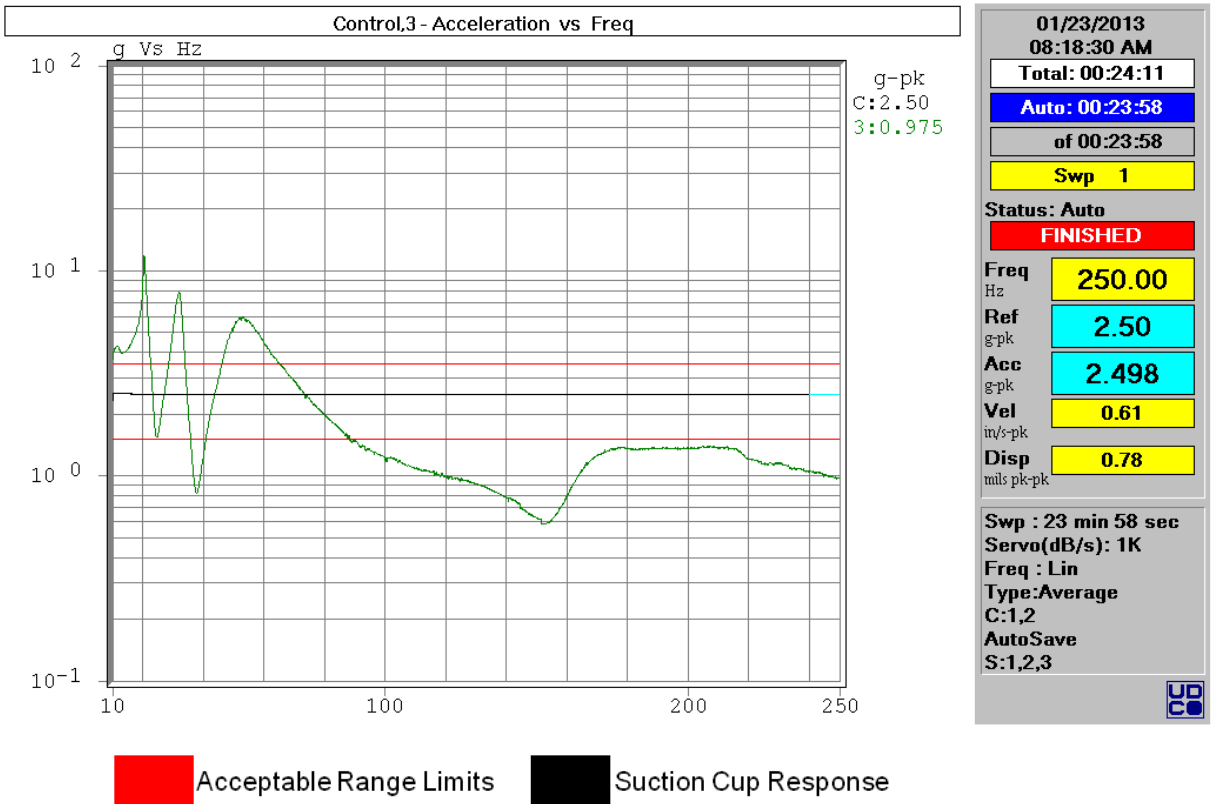
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
IPad Installed
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS8
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

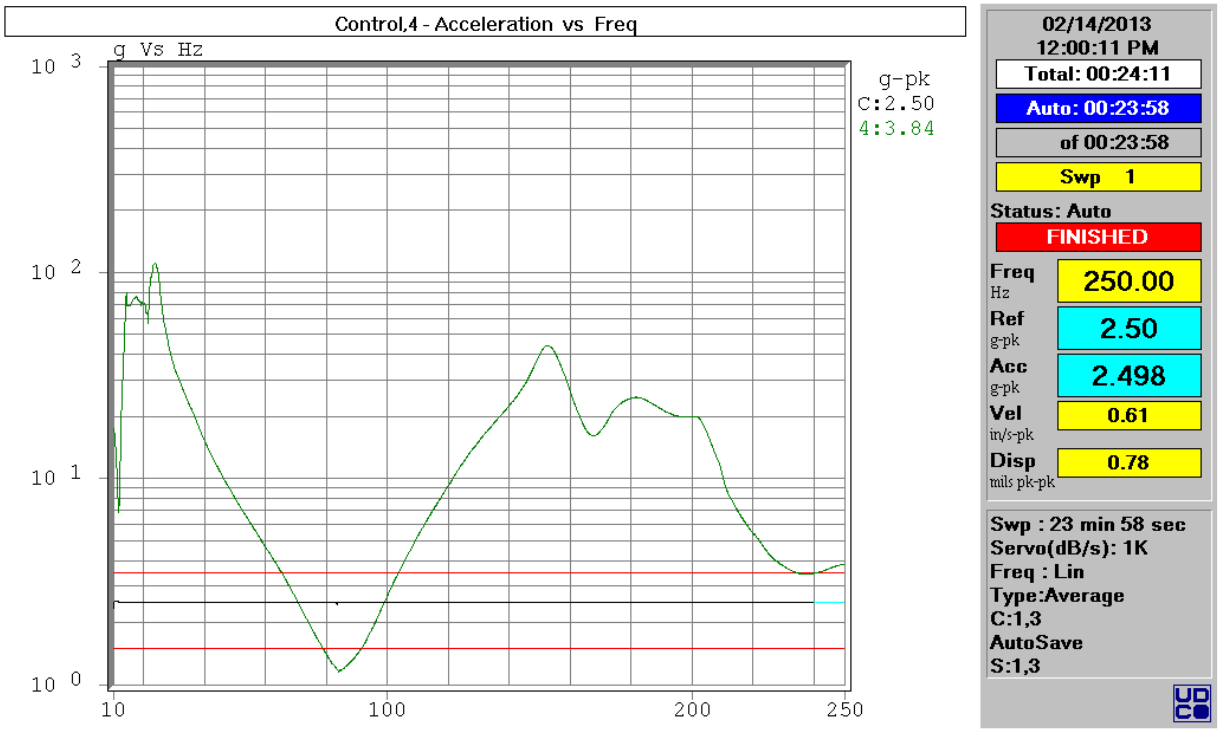
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS35
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

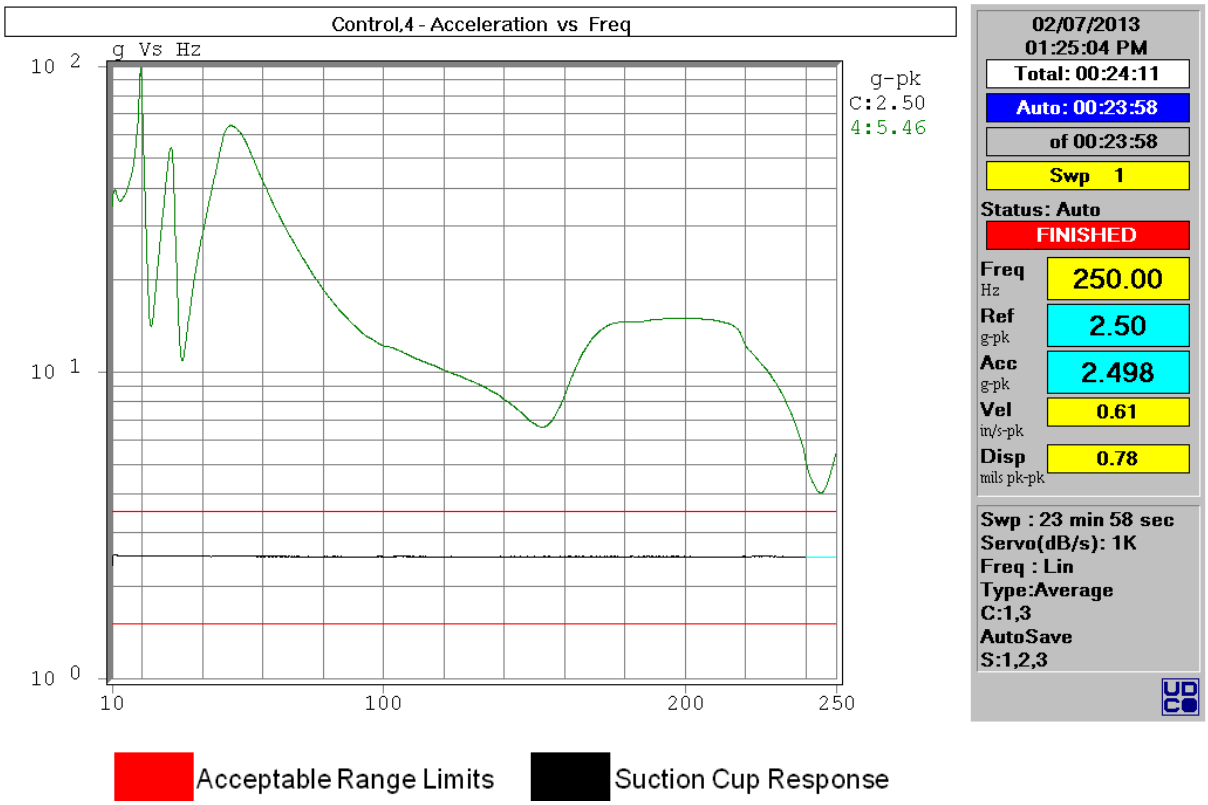
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
Ipad Installed
Cleaned windshield with cleaner prior to run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS23
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

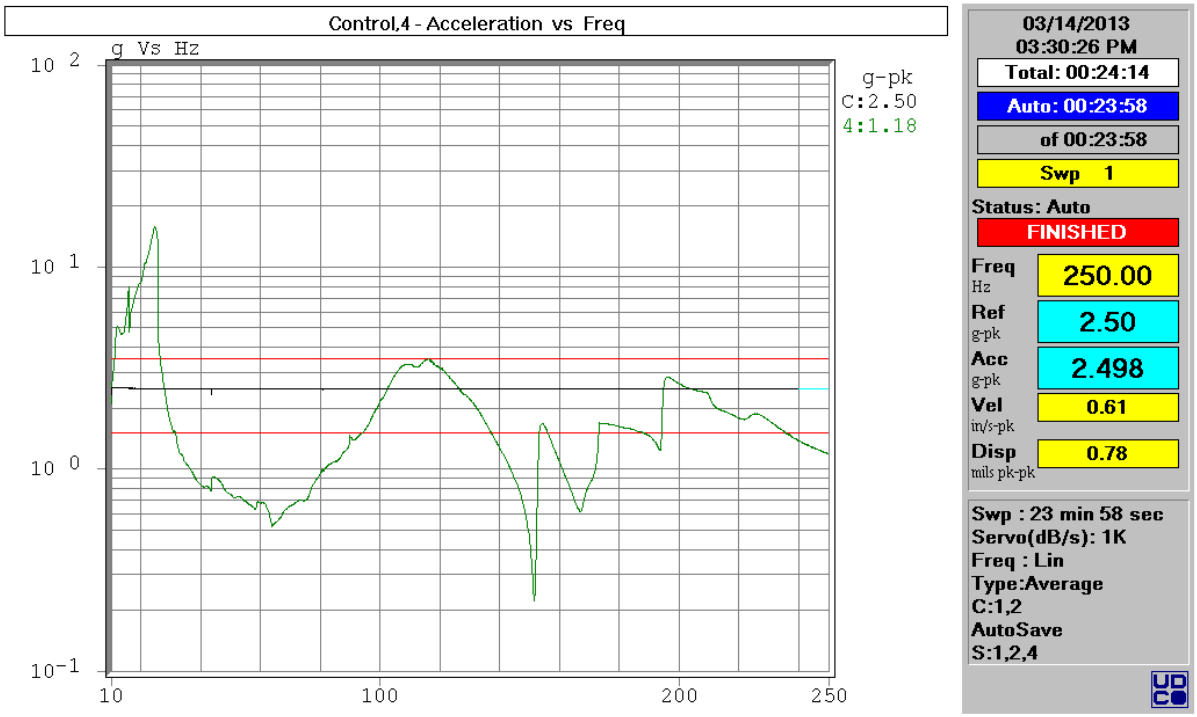
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Painted Surface

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
Ipad Plate Installed
Painted Surface
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS55
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

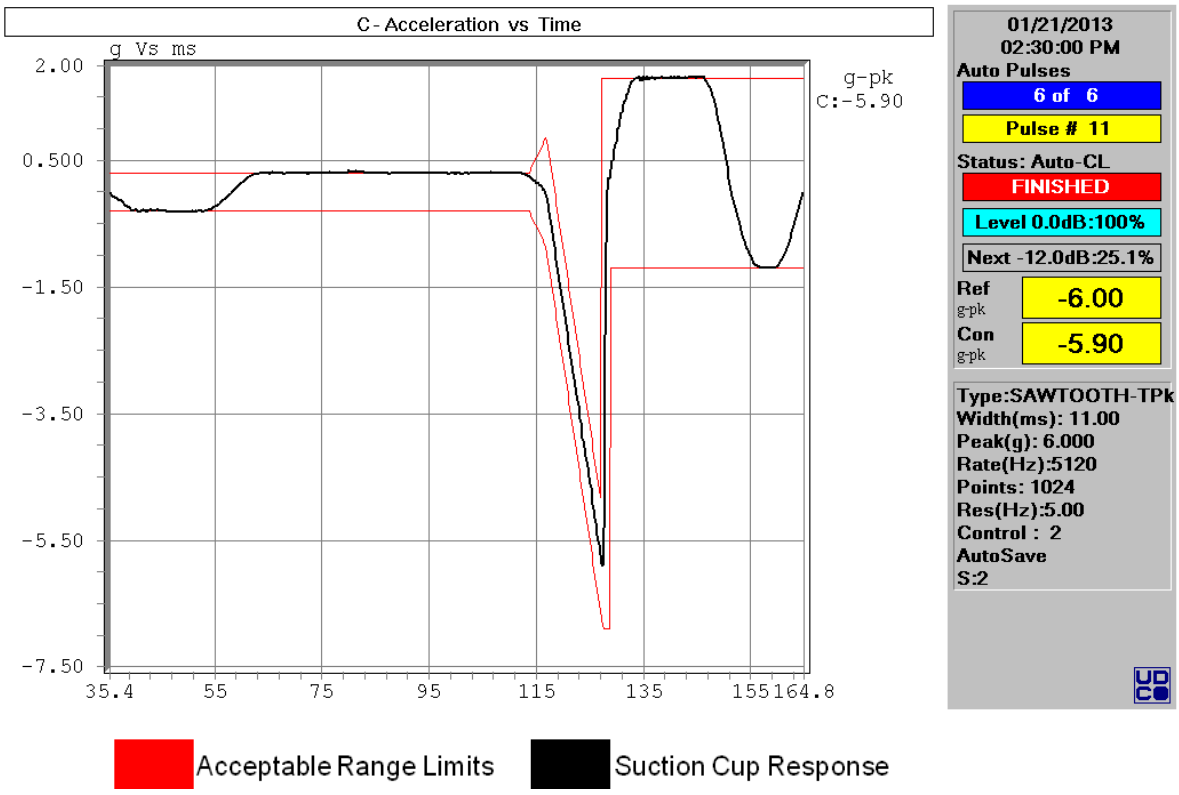
UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup B – Side to Side Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup B
Op Shock 6 G's 11 ms
RUN NAME: run12
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	**Level (dB)**	**Level (%)**	**Pulses #**	**Polarity (+/-)**	**Delay (ms)**	**Mode (O/C)**
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

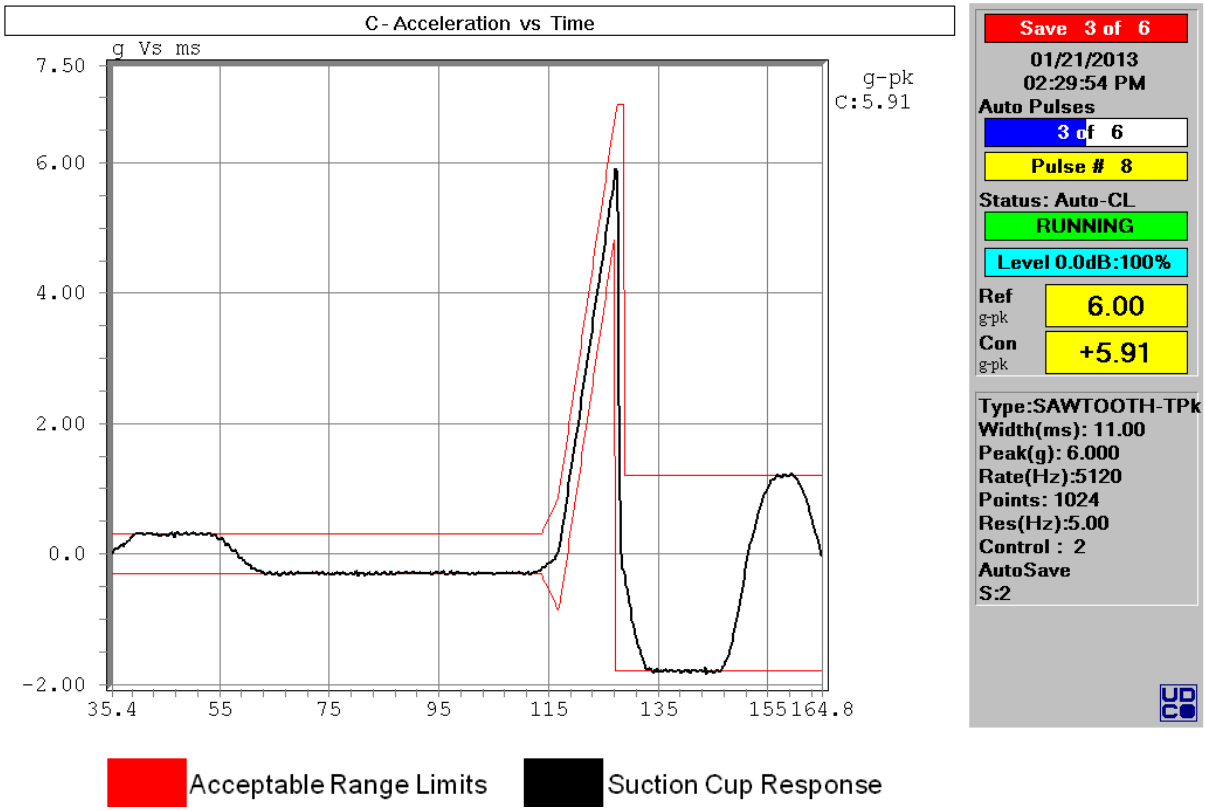
Seq#	**From**	**To**	**# Times**
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup B
Op Shock 6 G's 11 ms
RUN NAME: run12
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

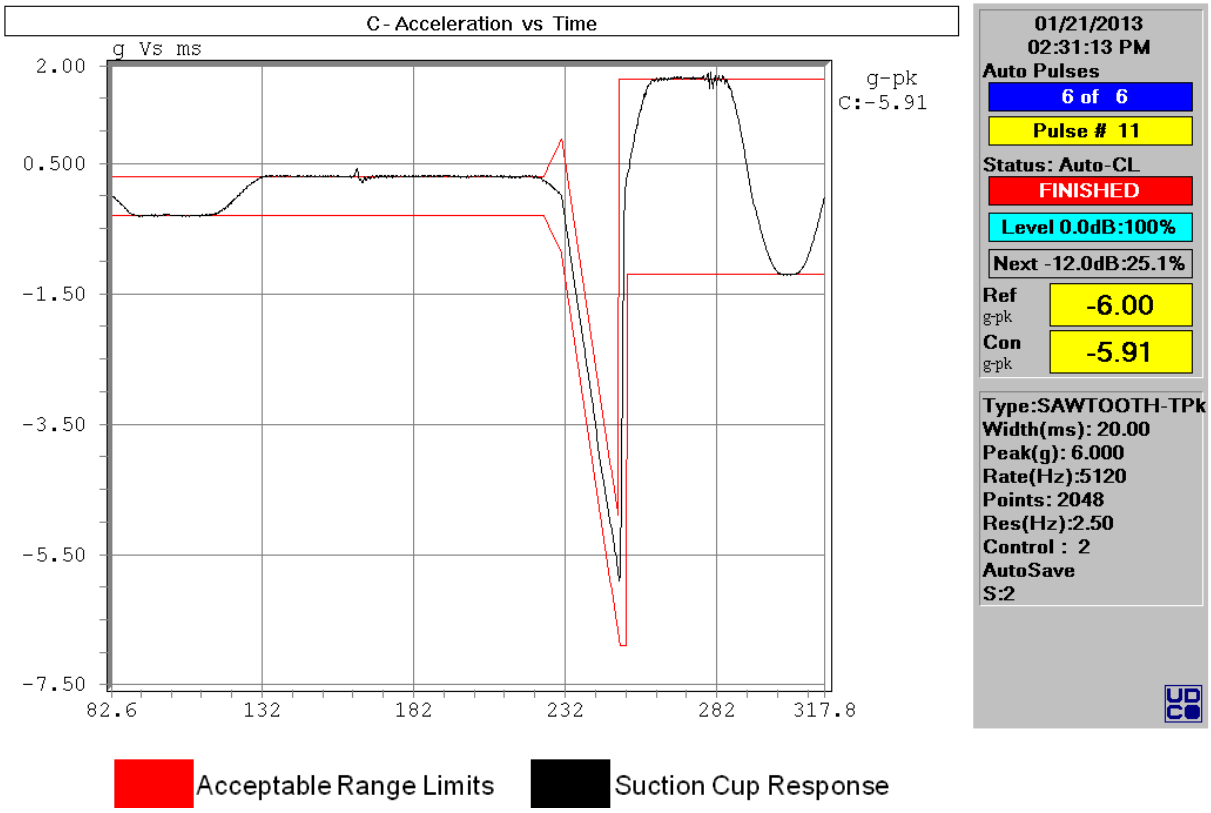
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup B
Op Shock 6 G's 20 ms
RUN NAME: run5
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS
WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

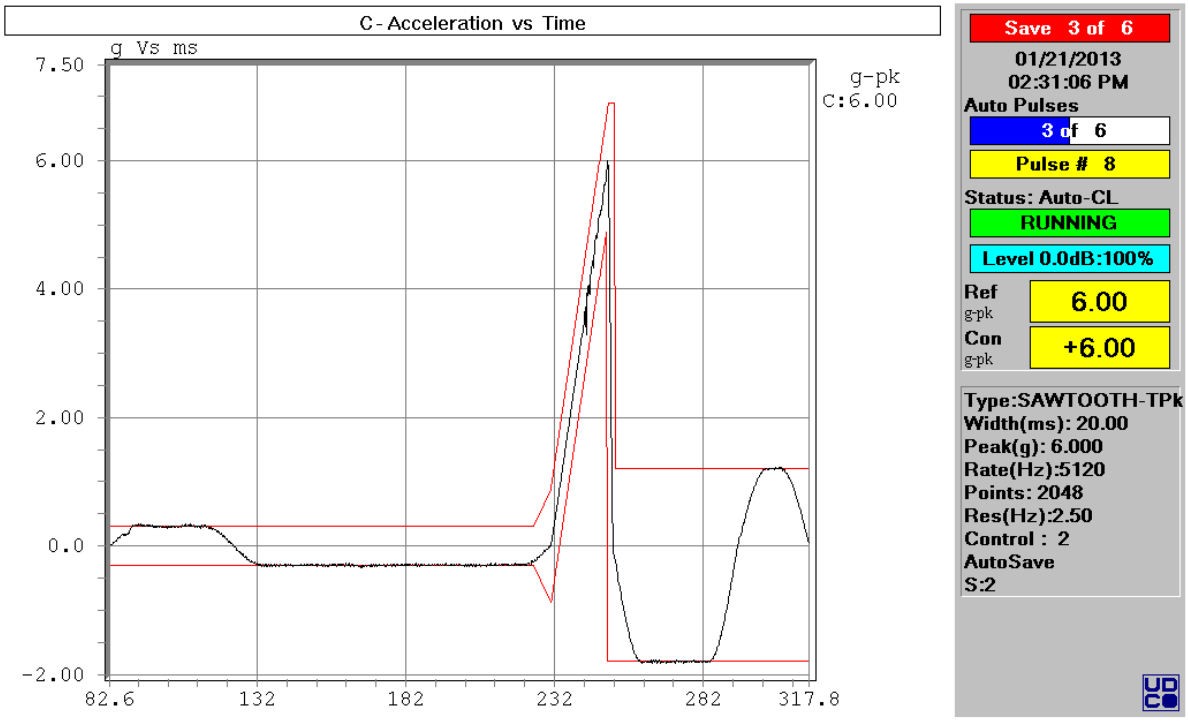
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup B
Op Shock 6 G's 20 ms
RUN NAME: run5
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
    PRE POSITIVE: 5.00
    PRE NEGATIVE: 5.00
    POST NEGATIVE: 30.00
    POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

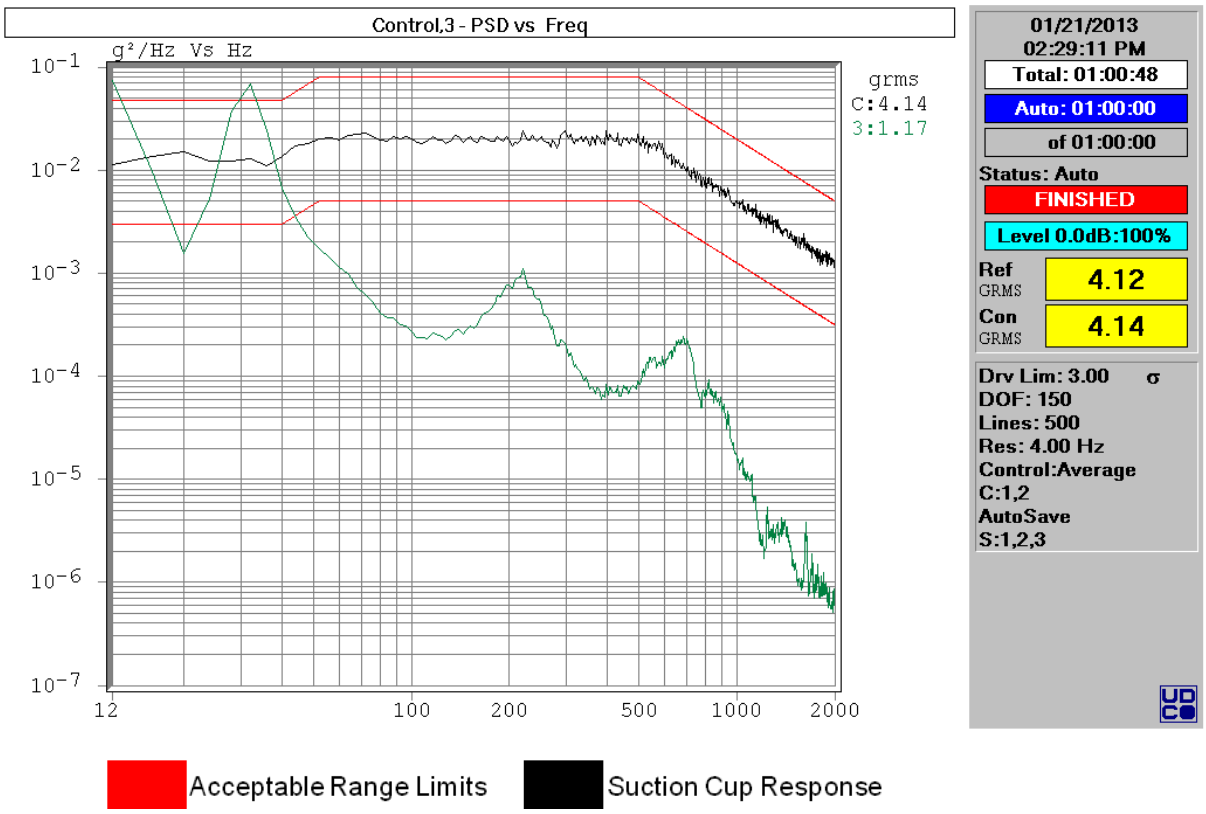
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup B
IPad installed
Side to Side Axis
Random Curve C
RUN NAME: run7
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

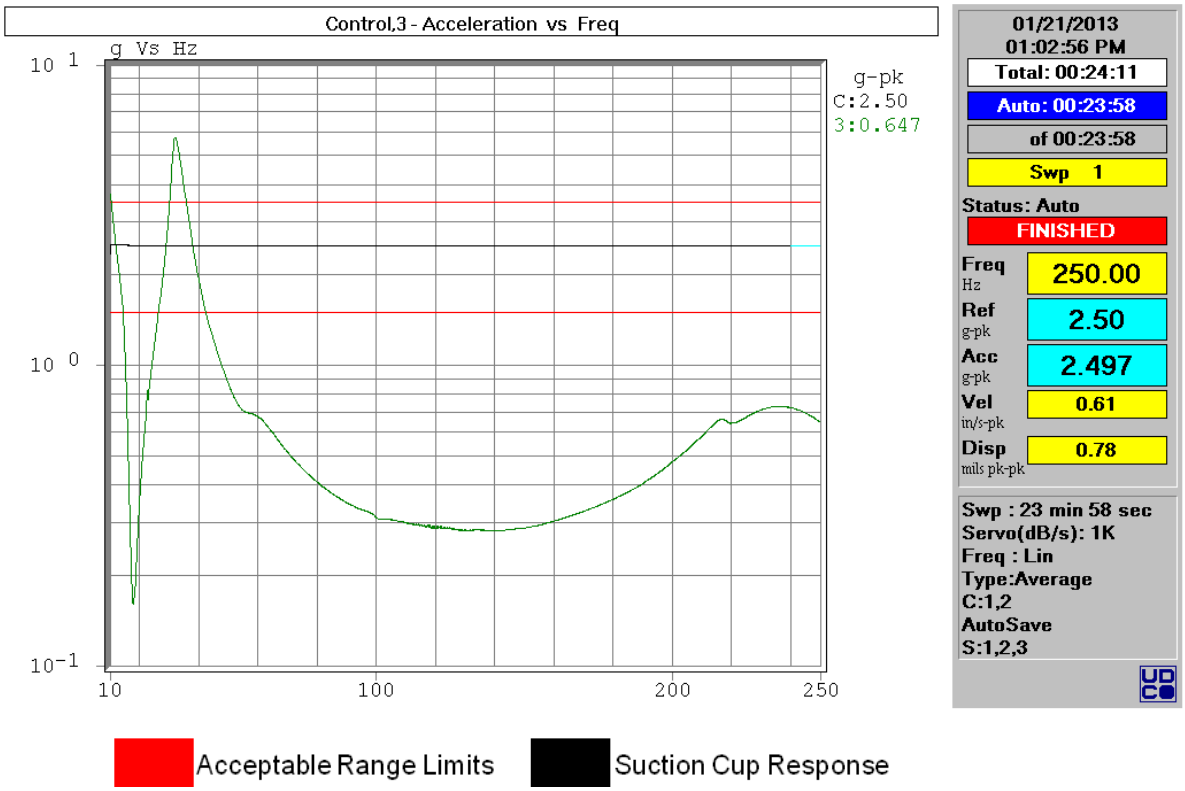
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
IPad Installed
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS7
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

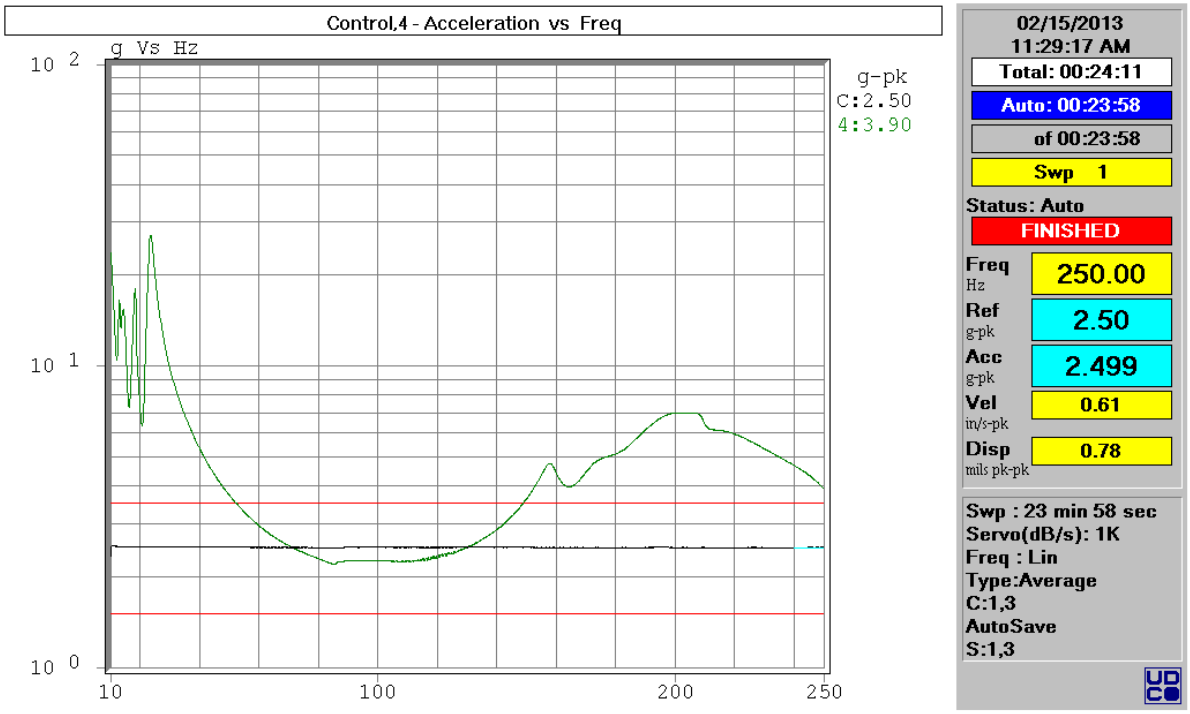
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS40
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

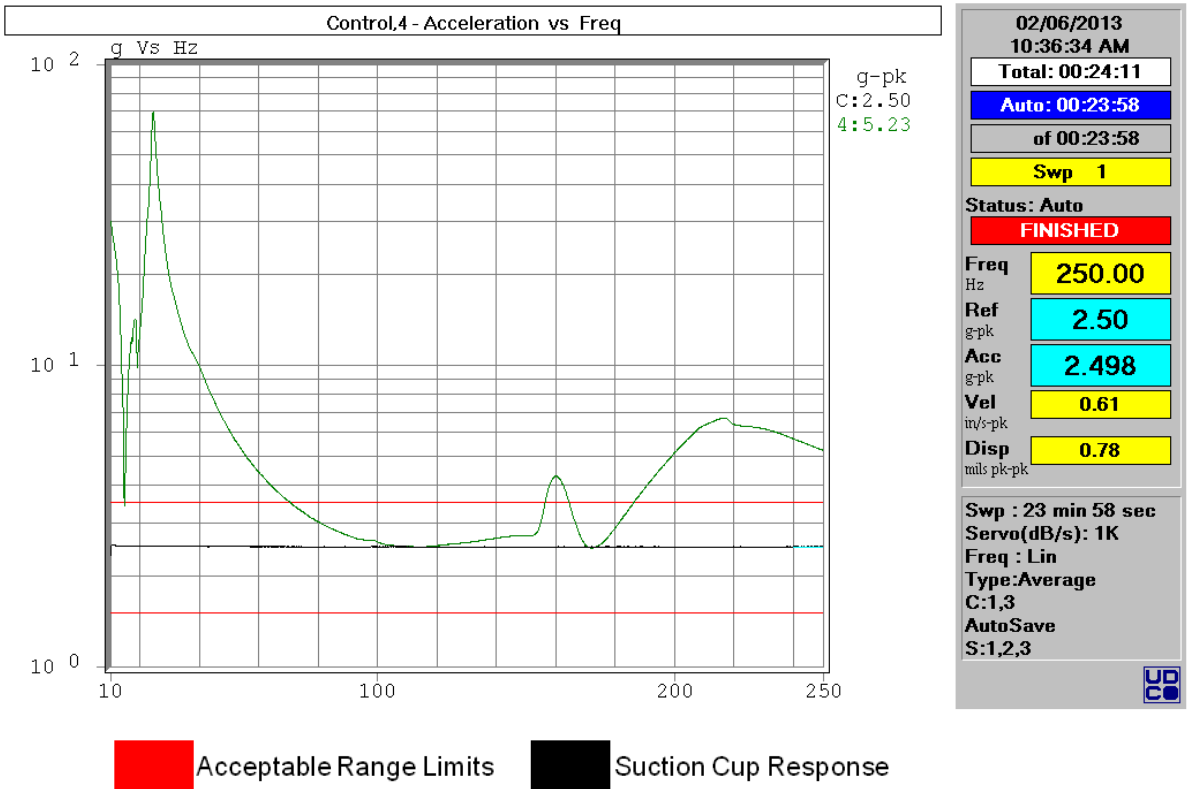
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
Dummy Load for IPad Installed
Cleaned windshield with cleaner prior to run
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS17
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

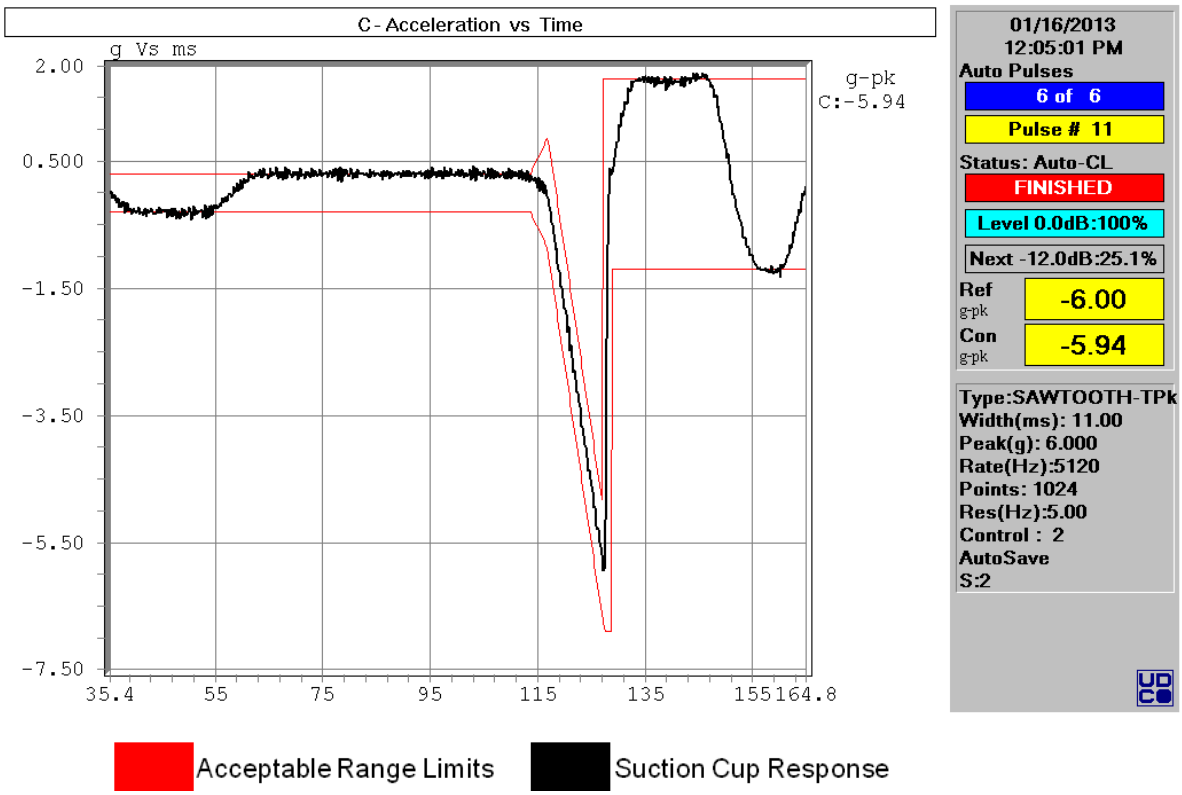
UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup B - Vertical Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup B
Op Shock 6 G's 11 ms
RUN NAME: run5
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

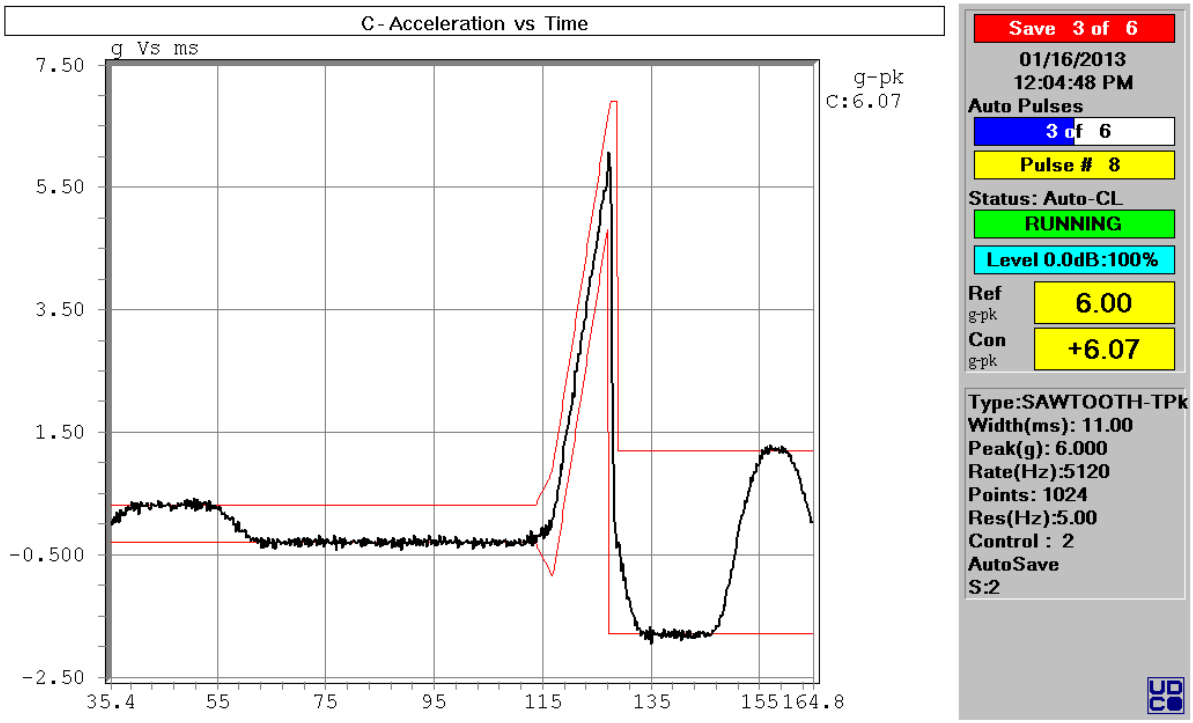
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup B
Op Shock 6 G's 11 ms
RUN NAME: run5
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

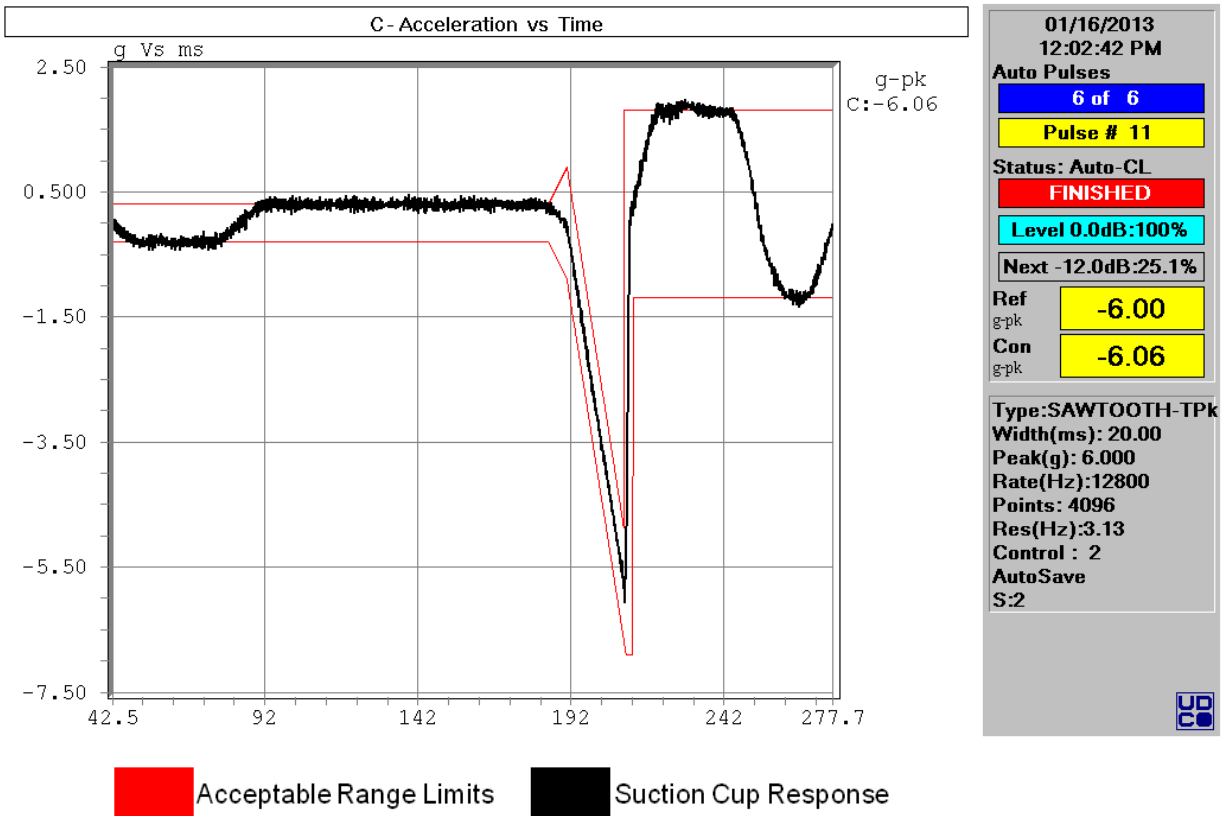
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup B
Op Shock 6 G's 11 ms
RUN NAME: run4
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 12800.0 Hz
FFT POINTS: 4096
FREQ. RESOLUTION/ TIME FRAME: 3.13 Hz/ 320.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

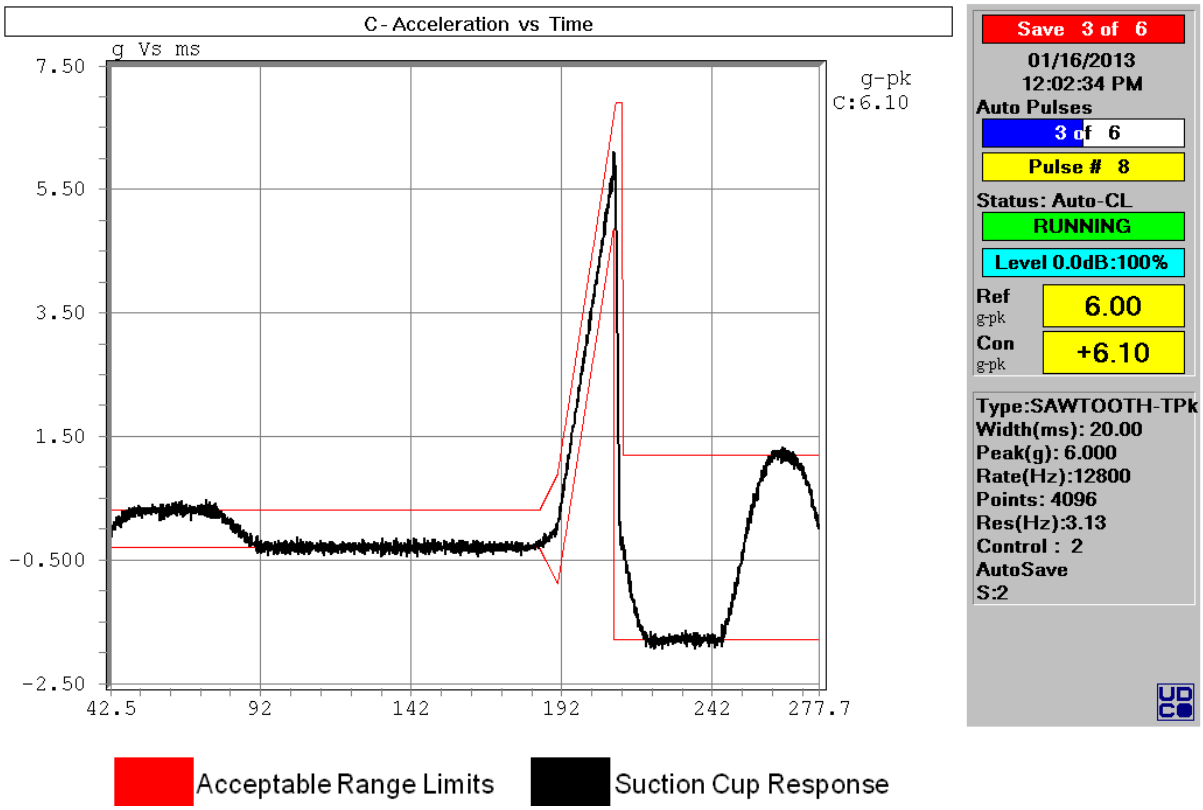
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup B
Op Shock 6 G's 11 ms
RUN NAME: run4
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 12800.0 Hz
FFT POINTS: 4096
FREQ. RESOLUTION/ TIME FRAME: 3.13 Hz/ 320.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

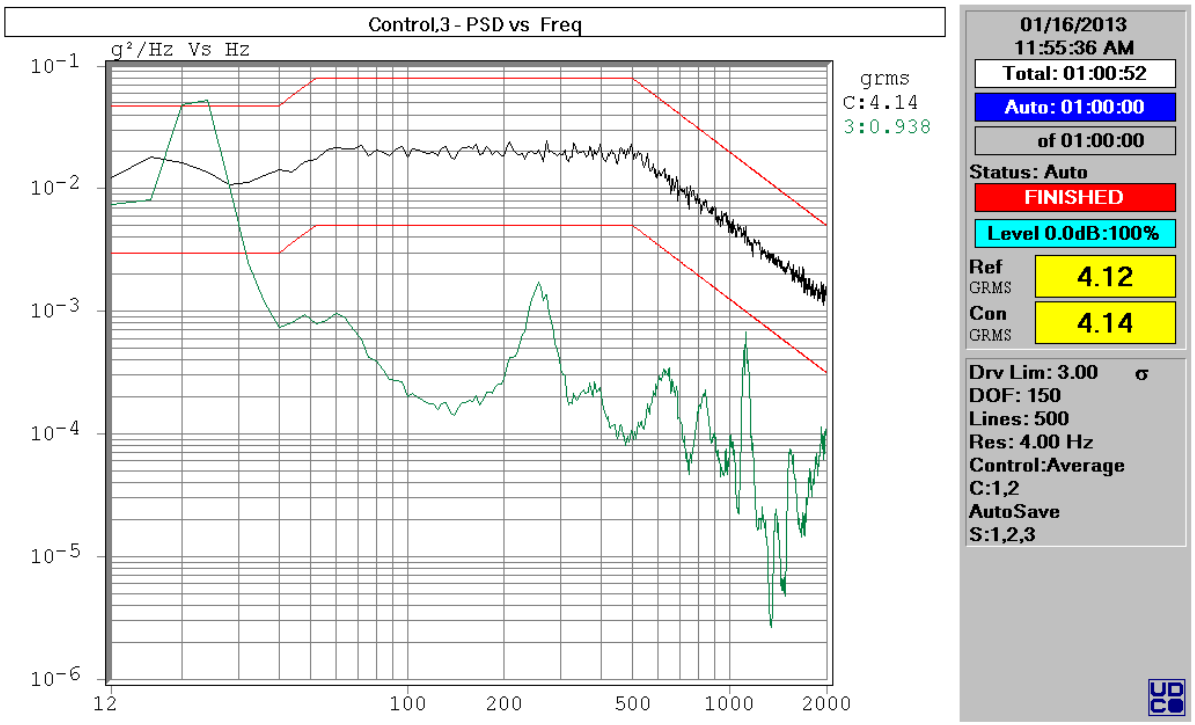
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup B
IPad installed
Vertical Axis
Random Curve C
RUN NAME: run1
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

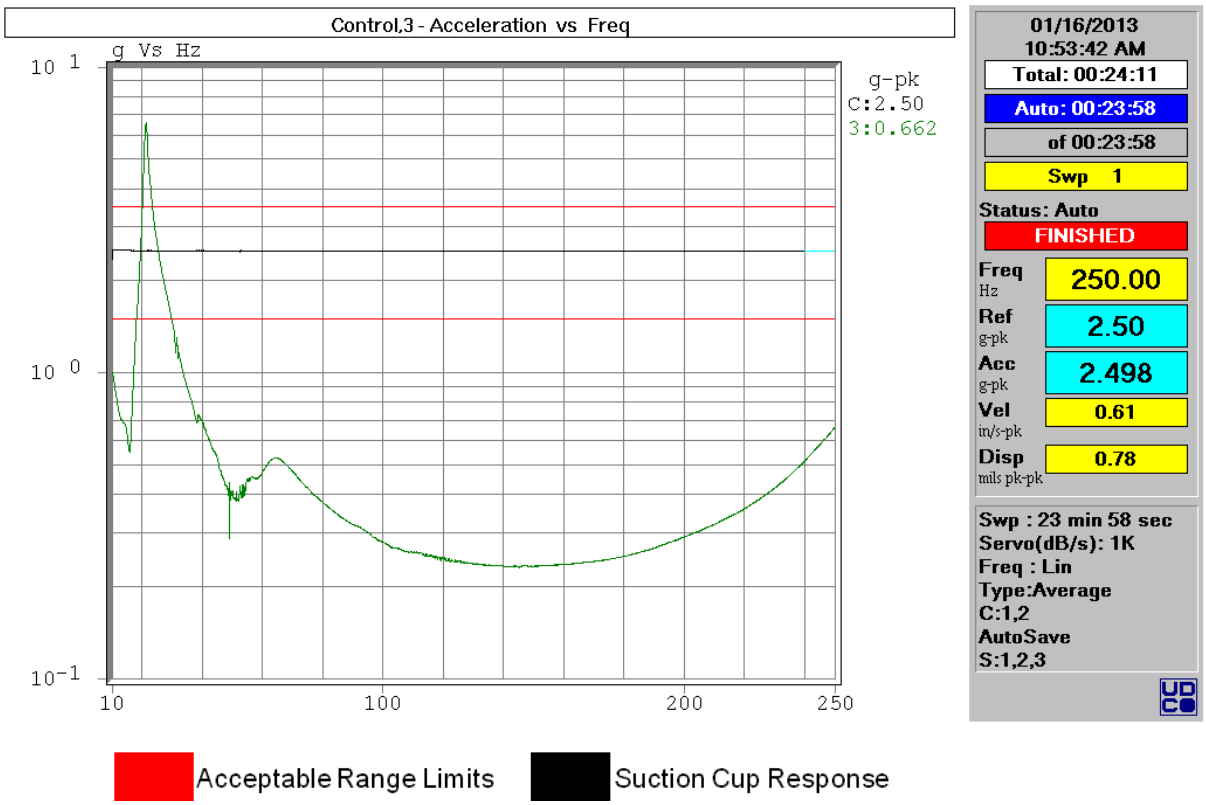
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
IPad Installed
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS1
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

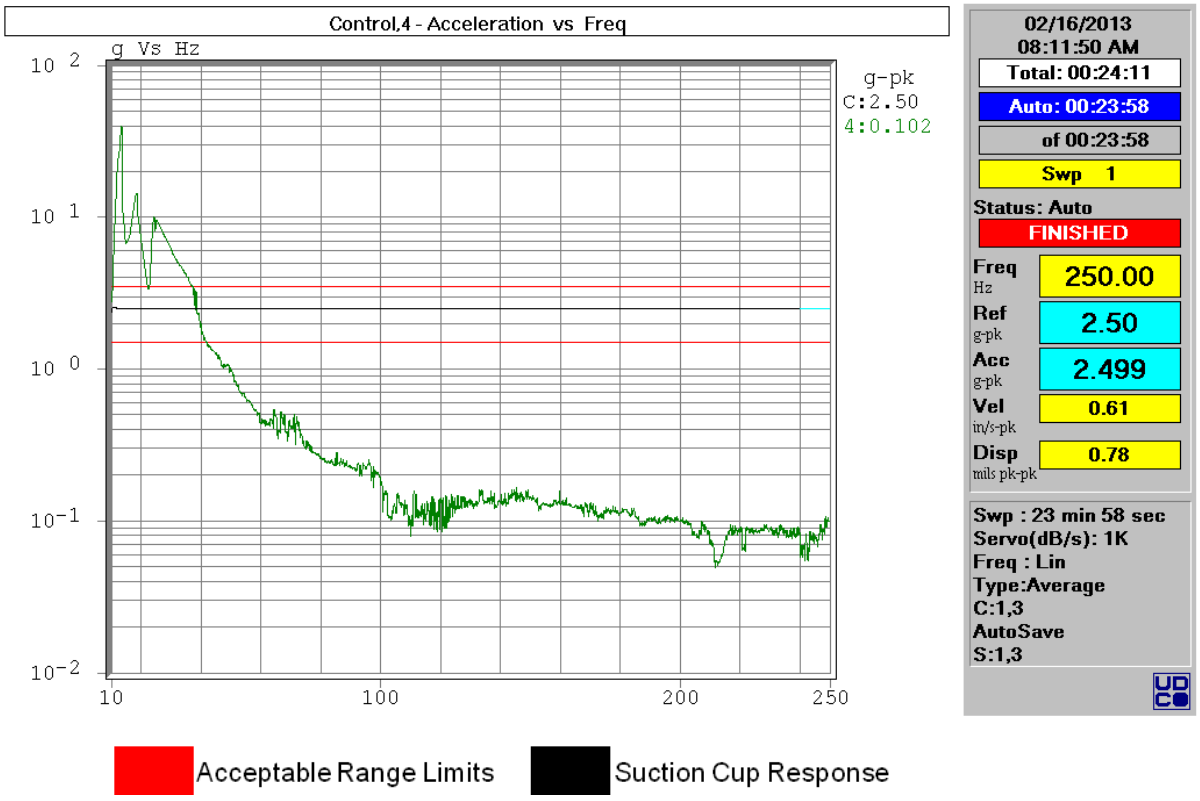
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS45
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

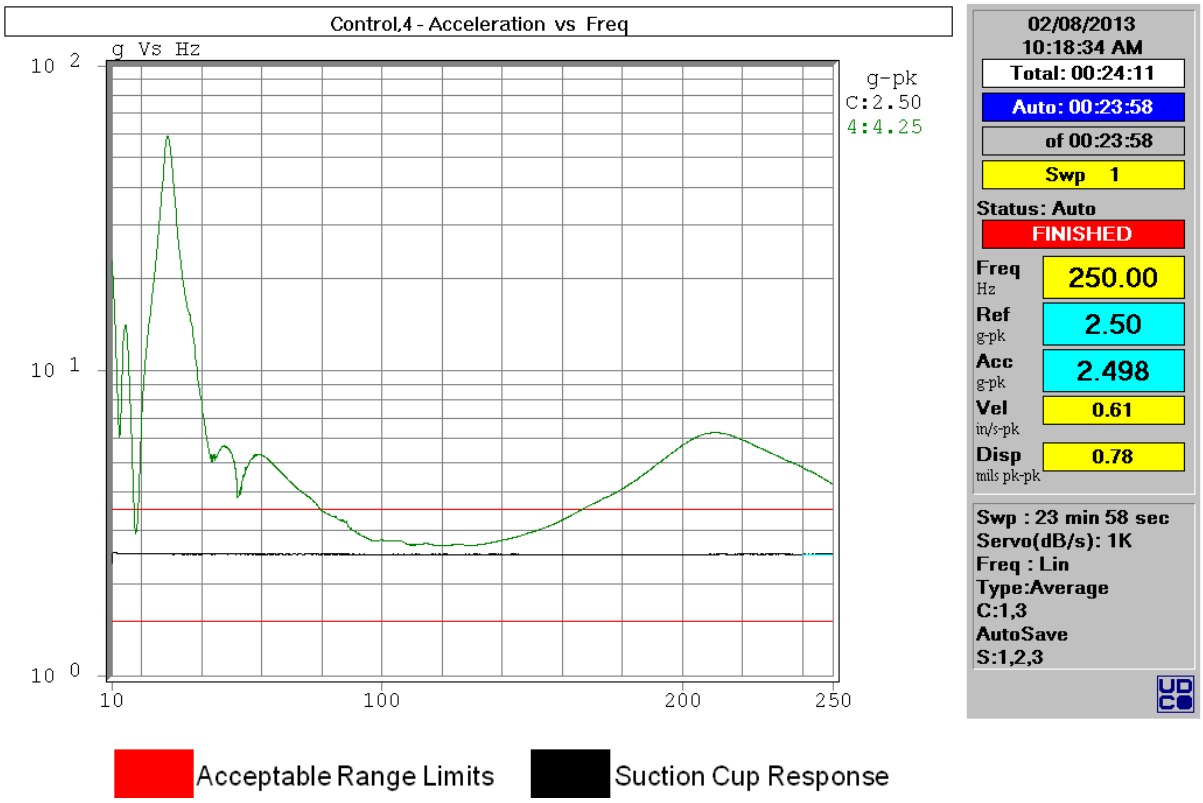
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
Ipad Installed
Cleaned windshield with cleaner prior to run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS27
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

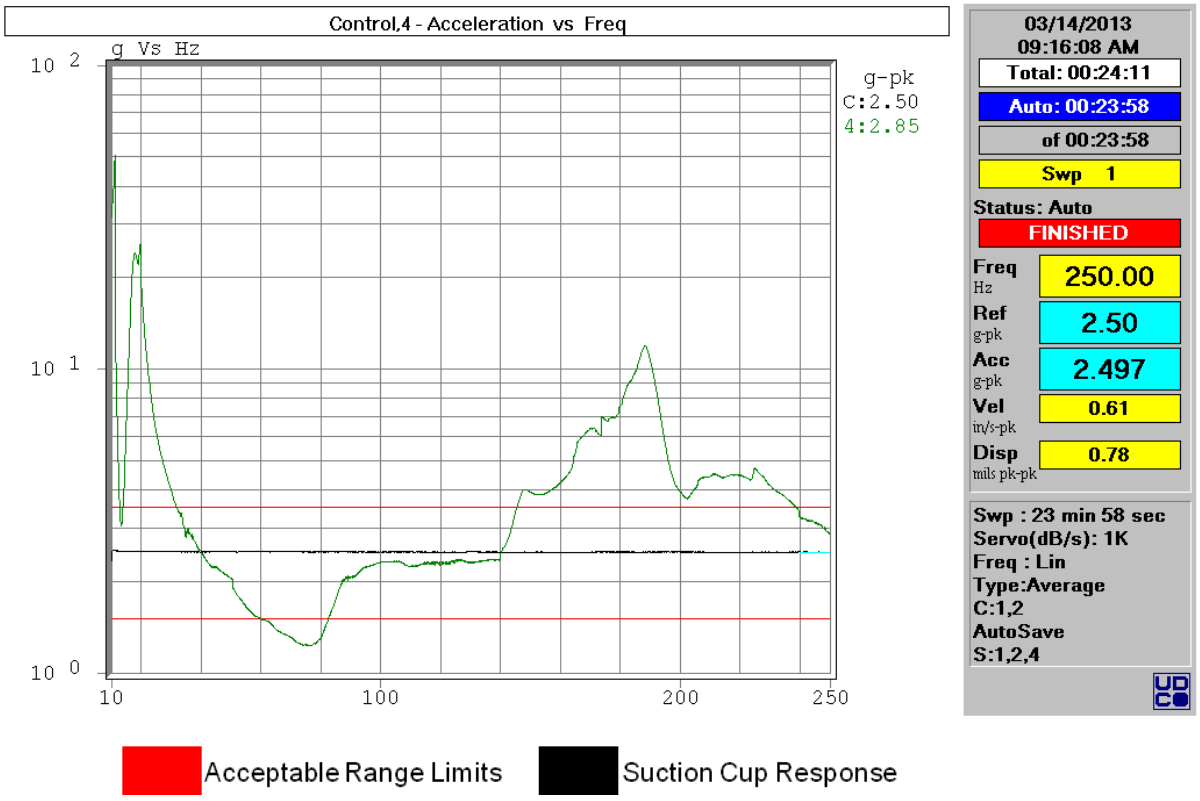
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Painted Surface

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup B
Ipad Plate Installed
Painted Surface
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS50
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Dust on Windscreen

Suction Cup B fell off of the plastic windshield before vibration could be started (About 10 minutes after attachment).

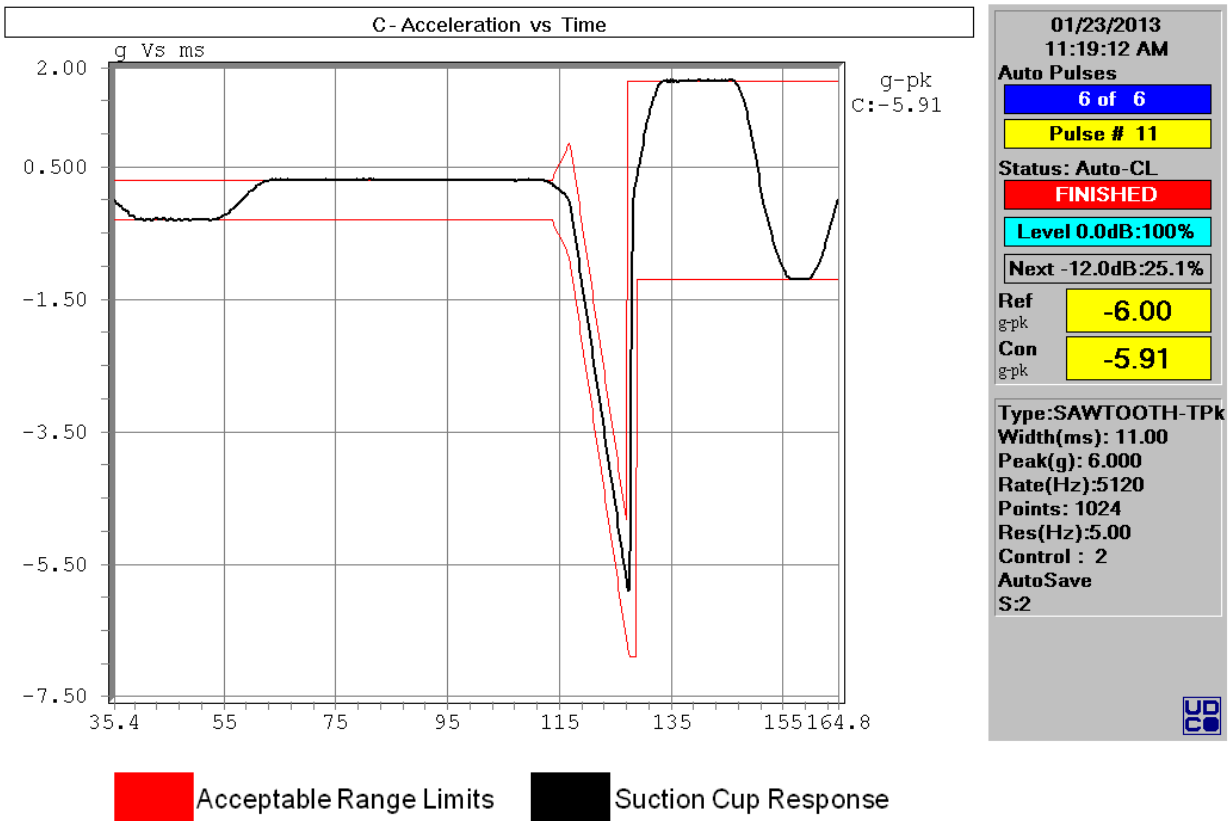
Suction Cup C

Suction Cup C – Front to Back Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup C
Op Shock 6 G's 11 ms
RUN NAME: run14
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

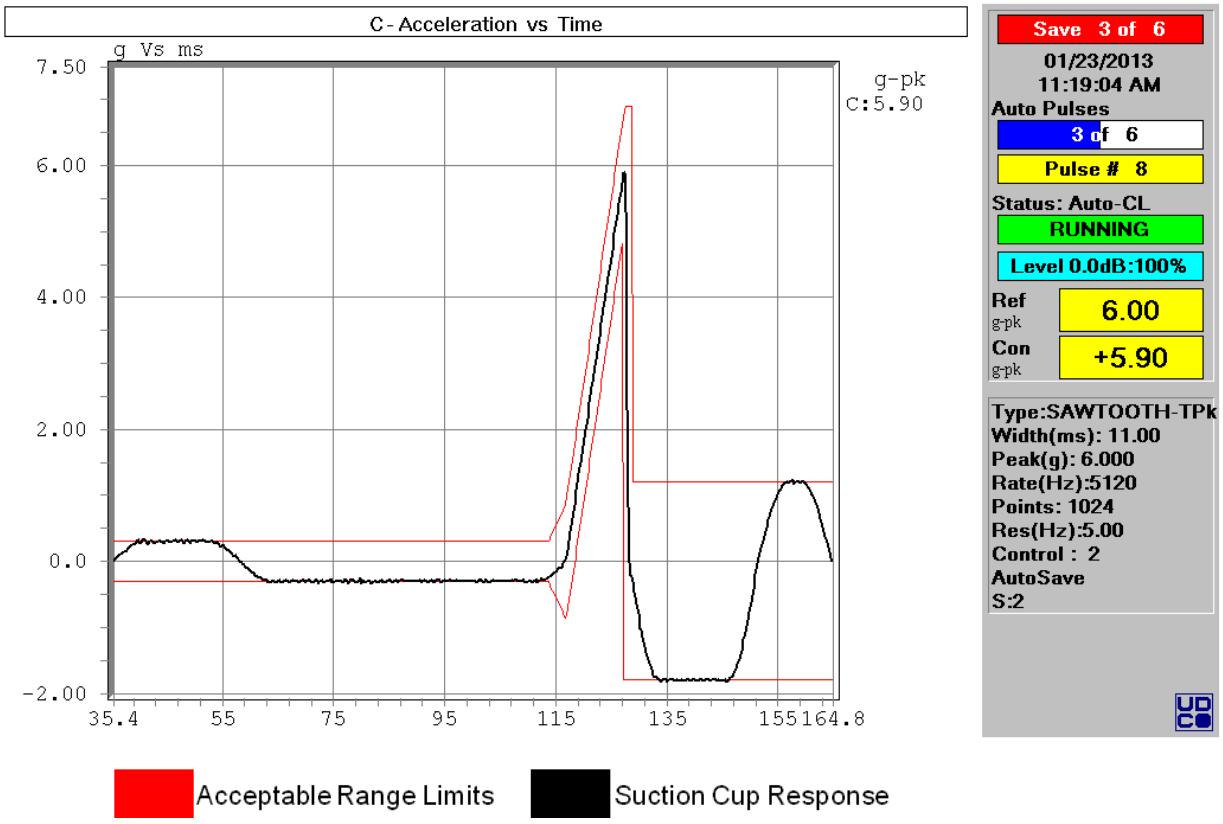
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup C
Op Shock 6 G's 11 ms
RUN NAME: run14
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

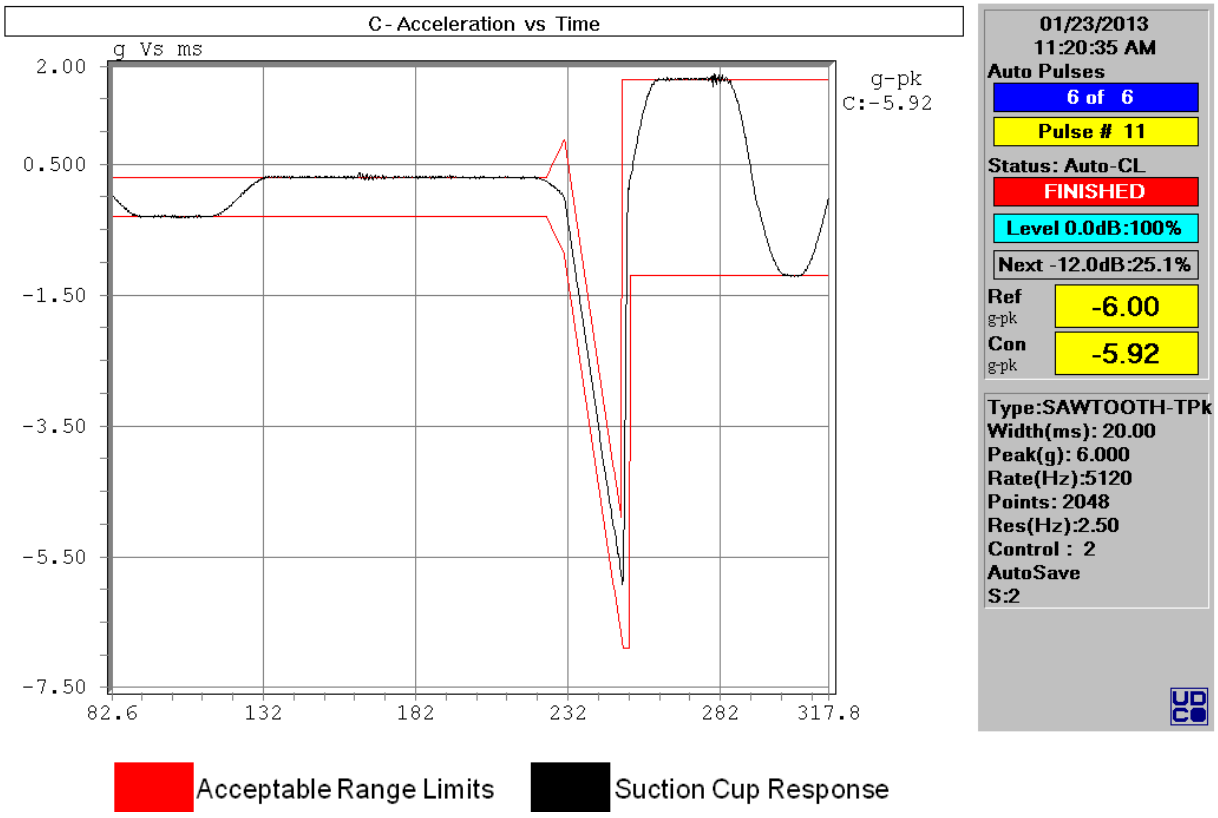
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup C
Op Shock 6 G's 20 ms
RUN NAME: run8
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

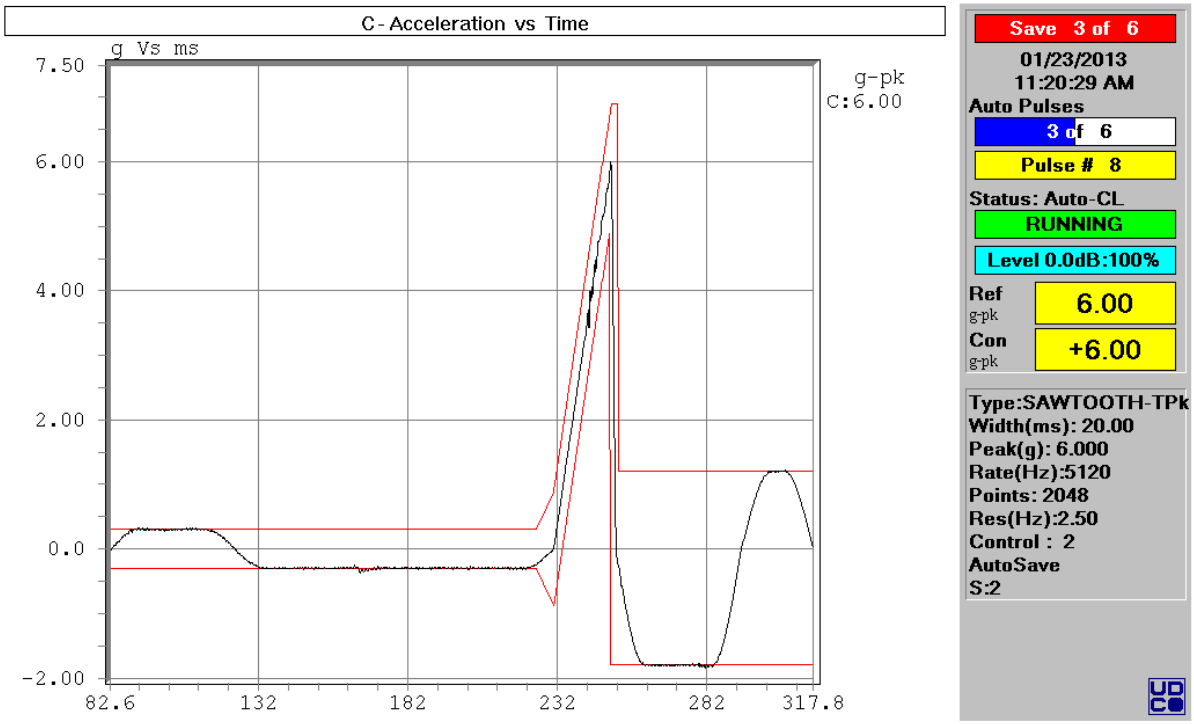
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup C
Op Shock 6 G's 20 ms
RUN NAME: run8
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

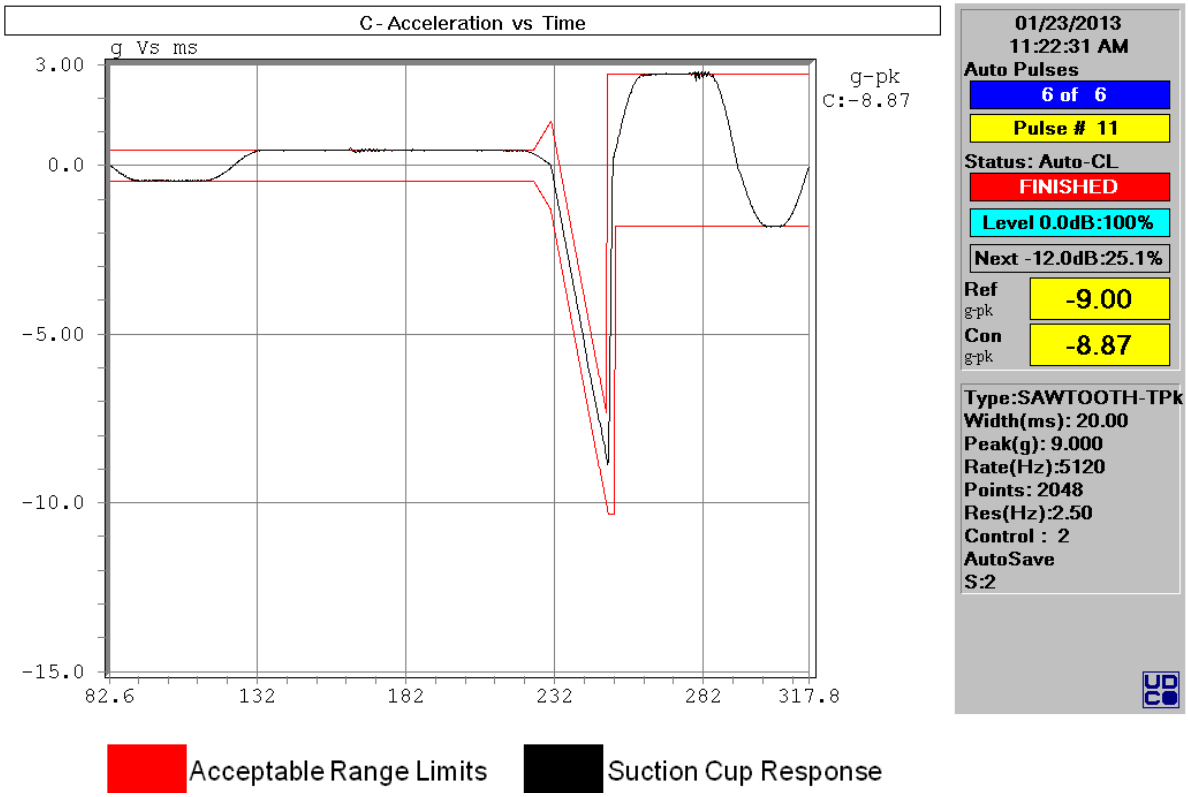
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

9G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup C
Op Shock 9 G's 20 ms
RUN NAME: run9
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 9.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

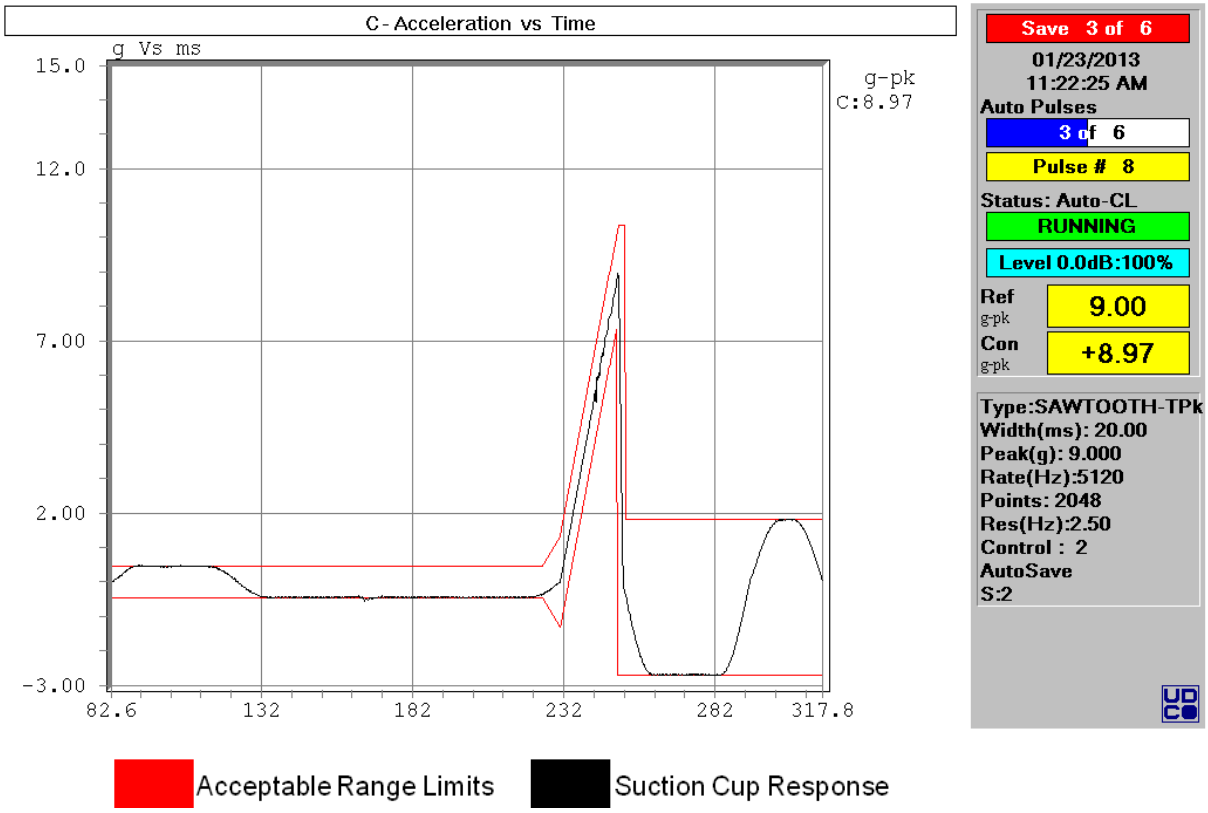
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

9G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup C
Op Shock 9 G's 20 ms
RUN NAME: run9
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 9.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

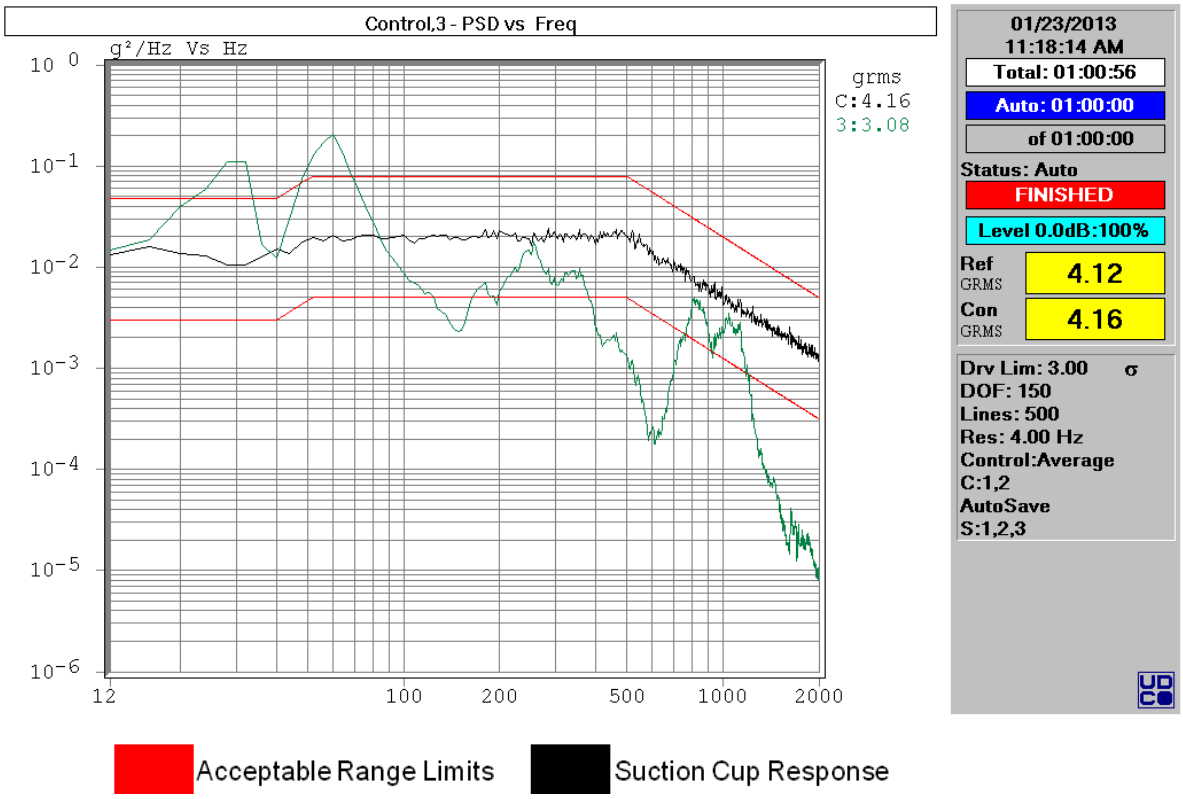
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup C
IPad installed
Front to Back Axis
Random Curve C
RUN NAME: run9
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

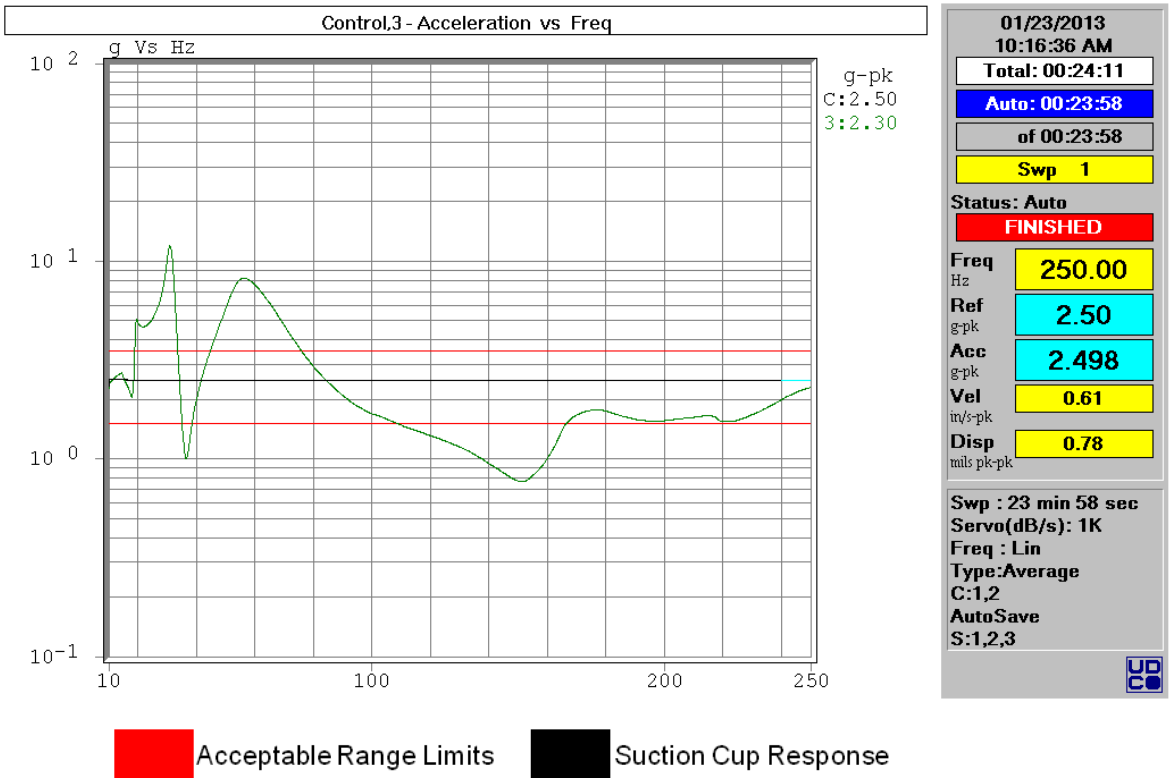
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup C
IPad Installed
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS9
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

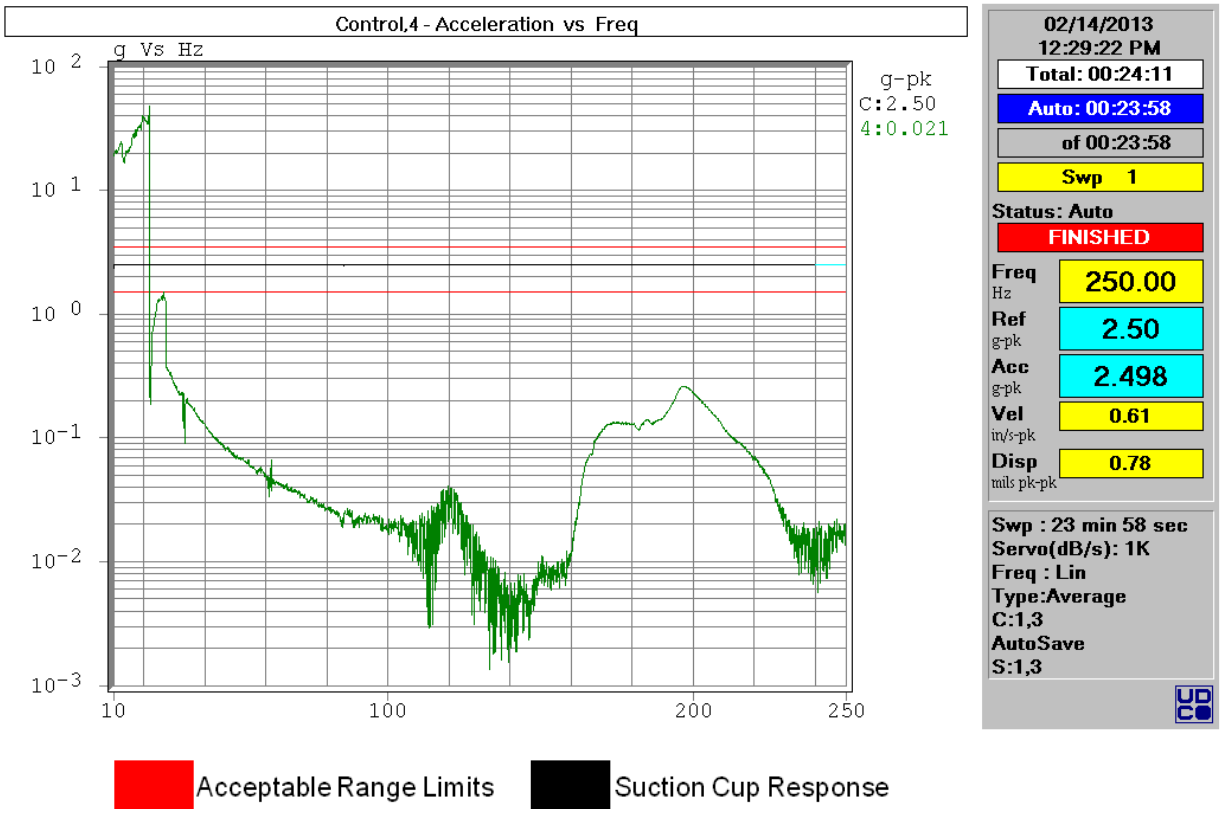
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup C
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS36
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

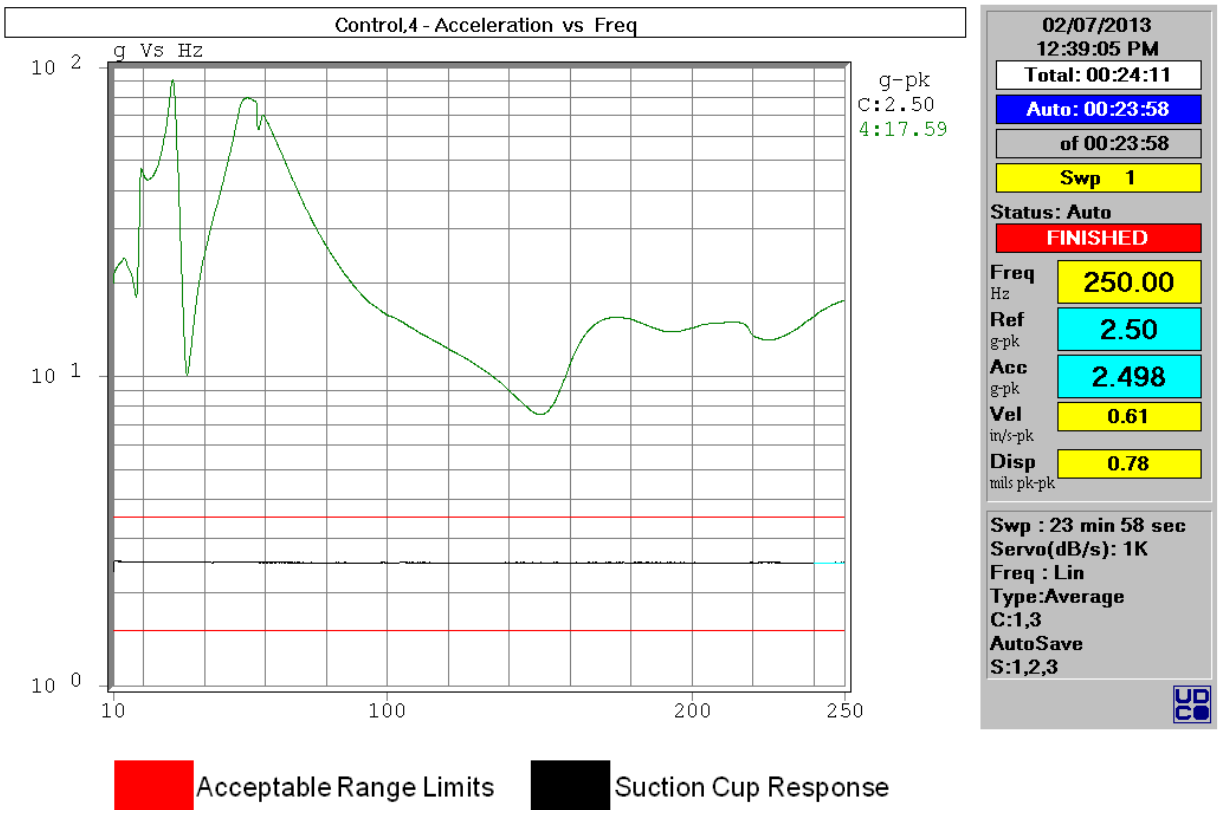
TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner
Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup t C
Ipad Installed
Cleaned windshield with cleaner prior to run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS22
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

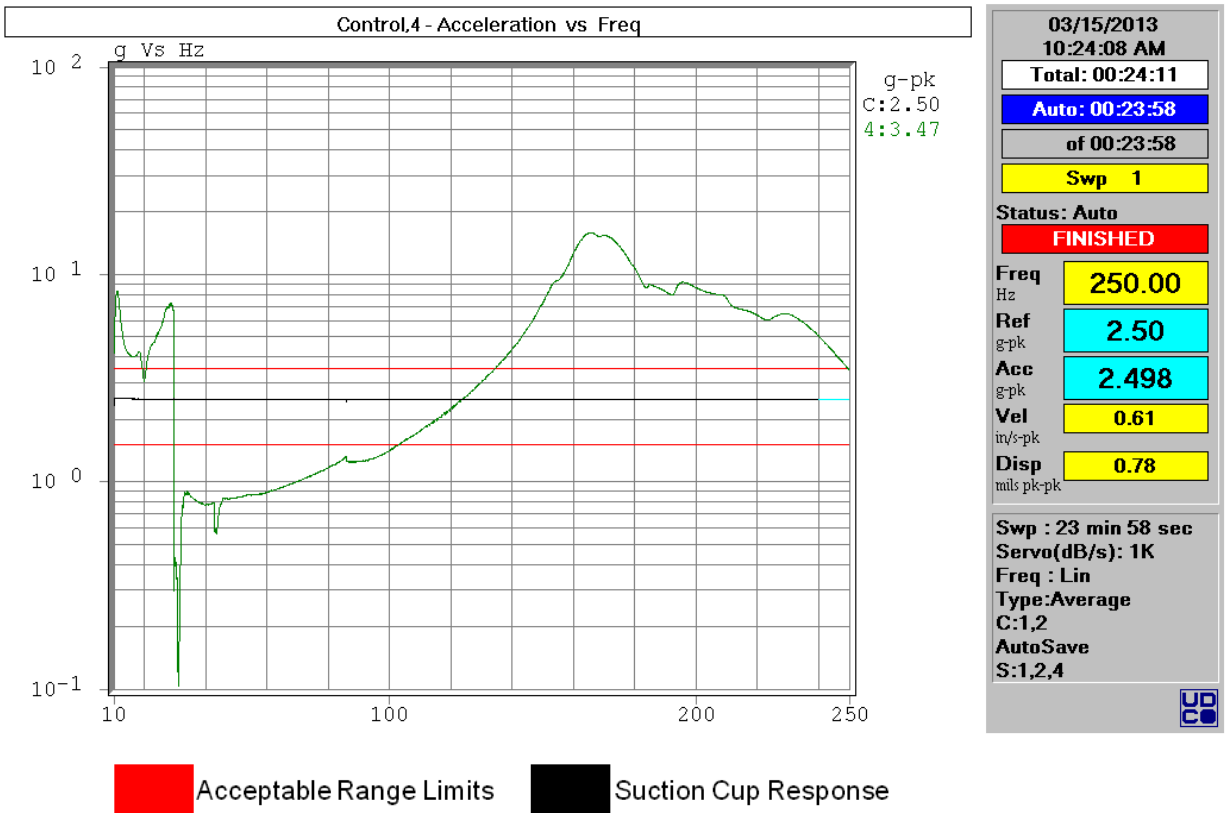
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Painted Surface

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup C
Ipad Plate Installed
Painted Surface Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS56
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

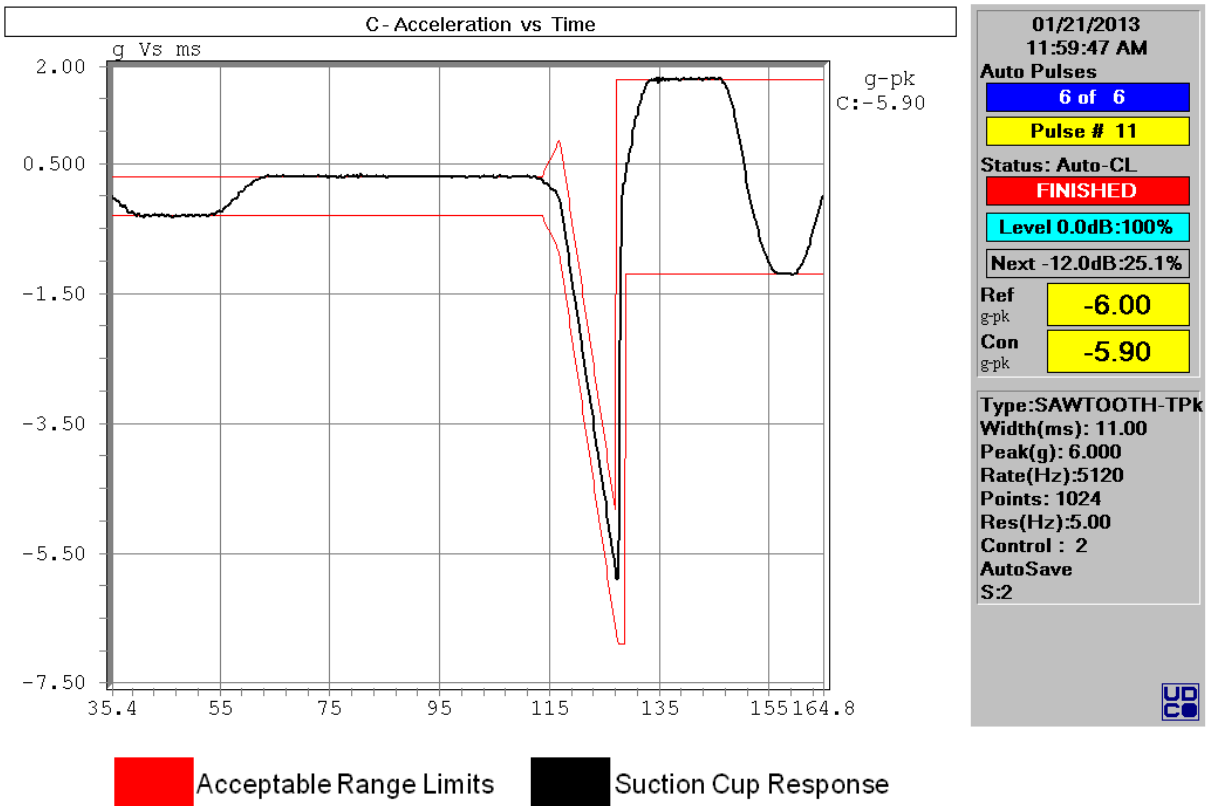
UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup C – Side to Side Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup C
Op Shock 6 G's 11 ms
RUN NAME: run11
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

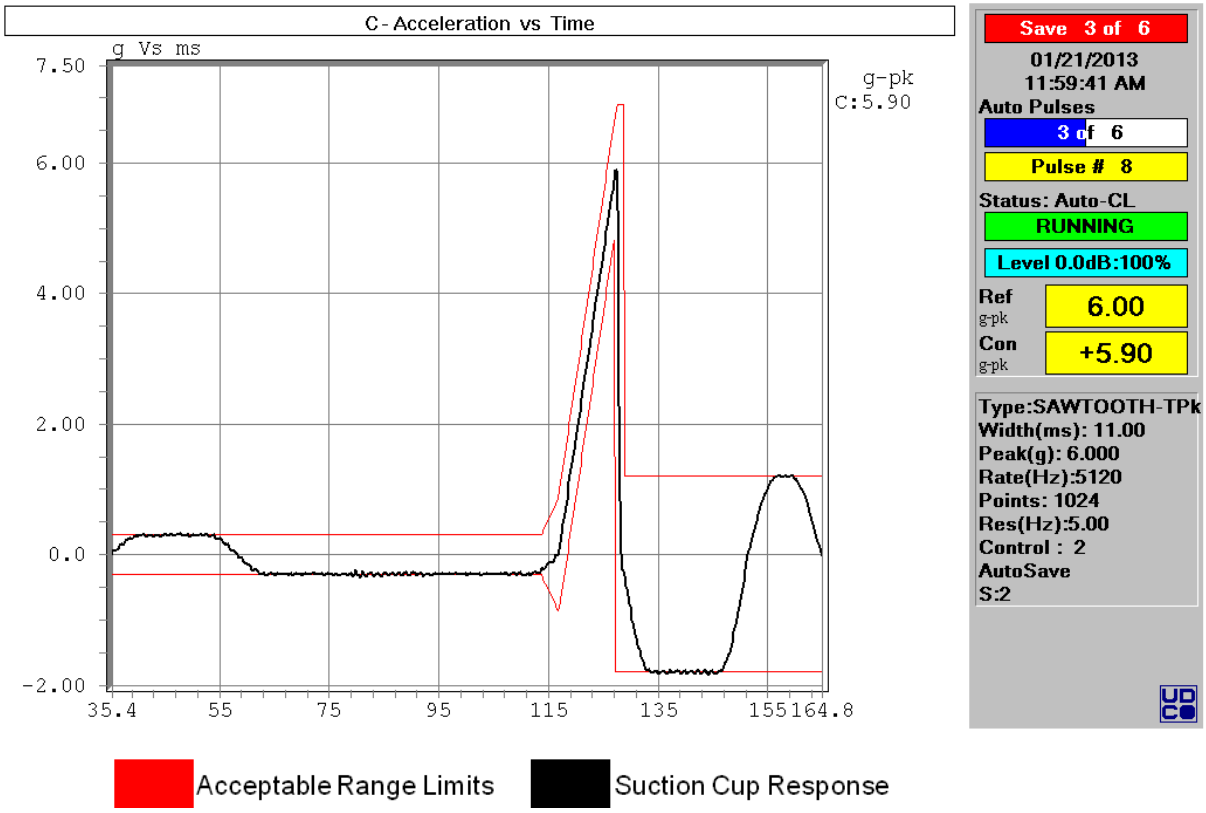
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup C
Op Shock 6 G's 11 ms
RUN NAME: run11
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

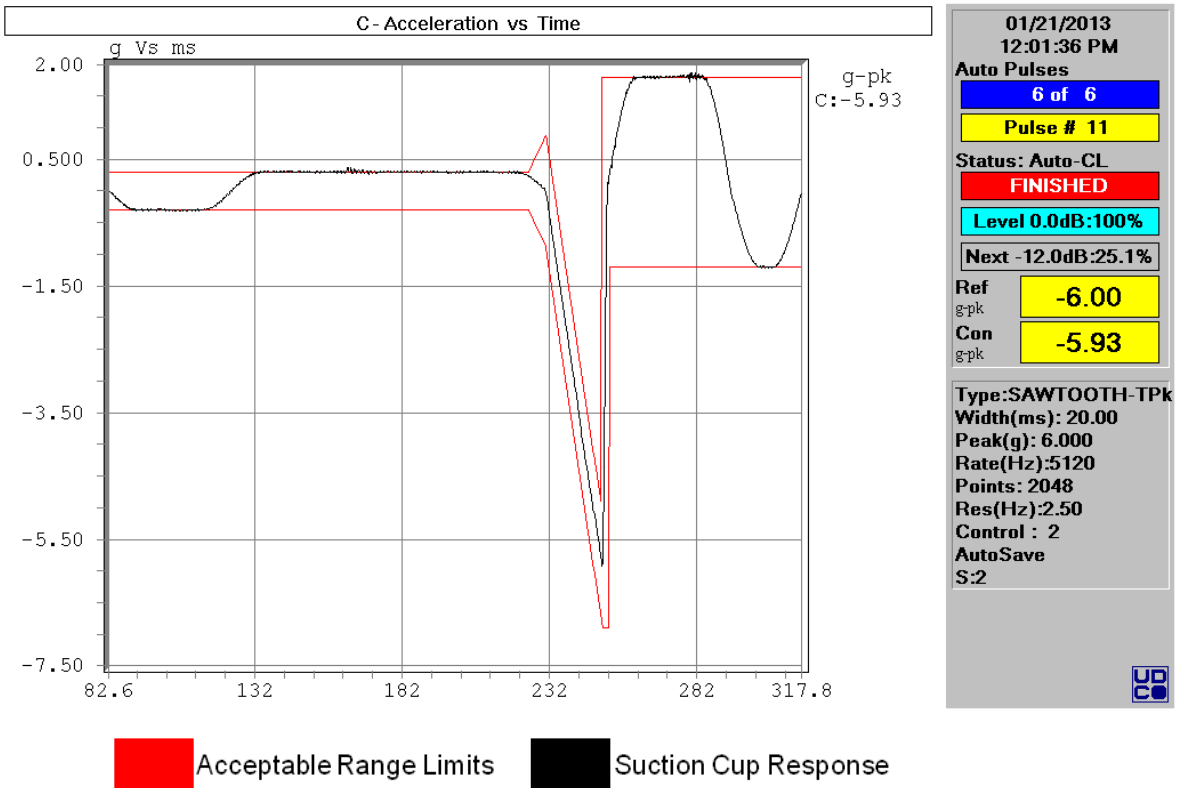
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup C
Op Shock 6 G's 20 ms
RUN NAME: run4
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

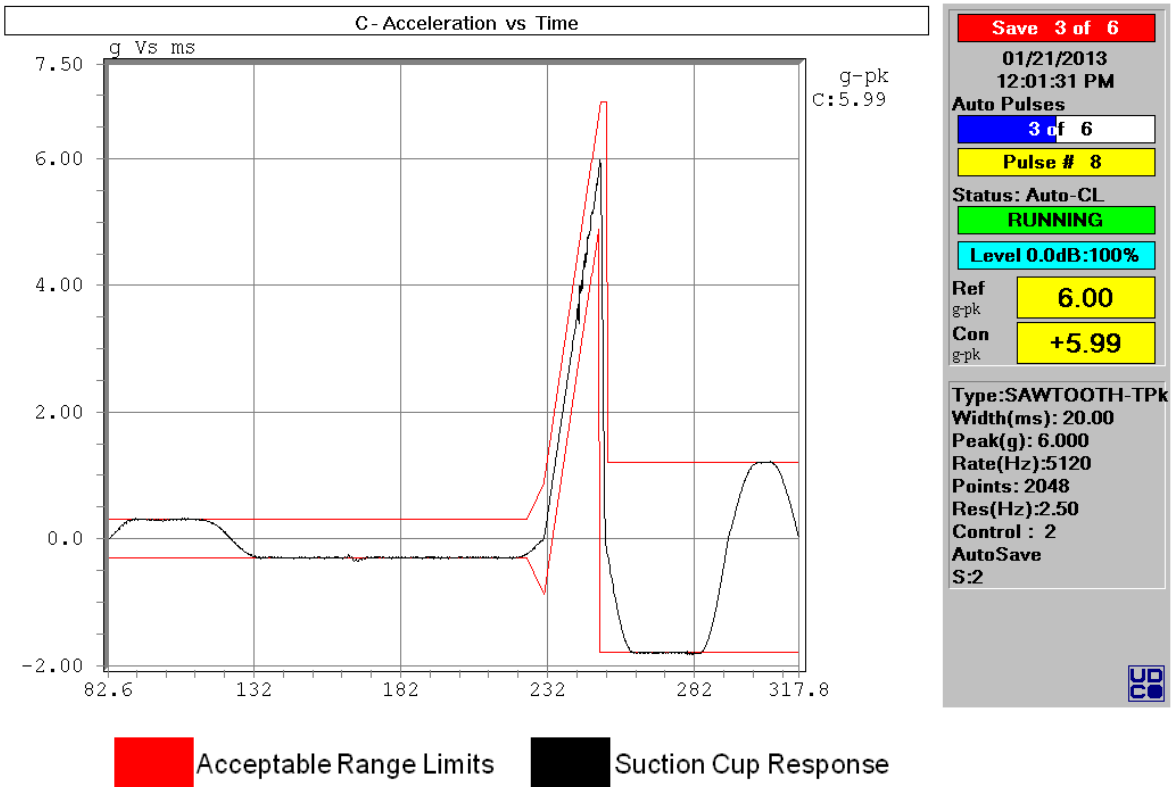
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup C
Op Shock 6 G's 20 ms
RUN NAME: run4
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

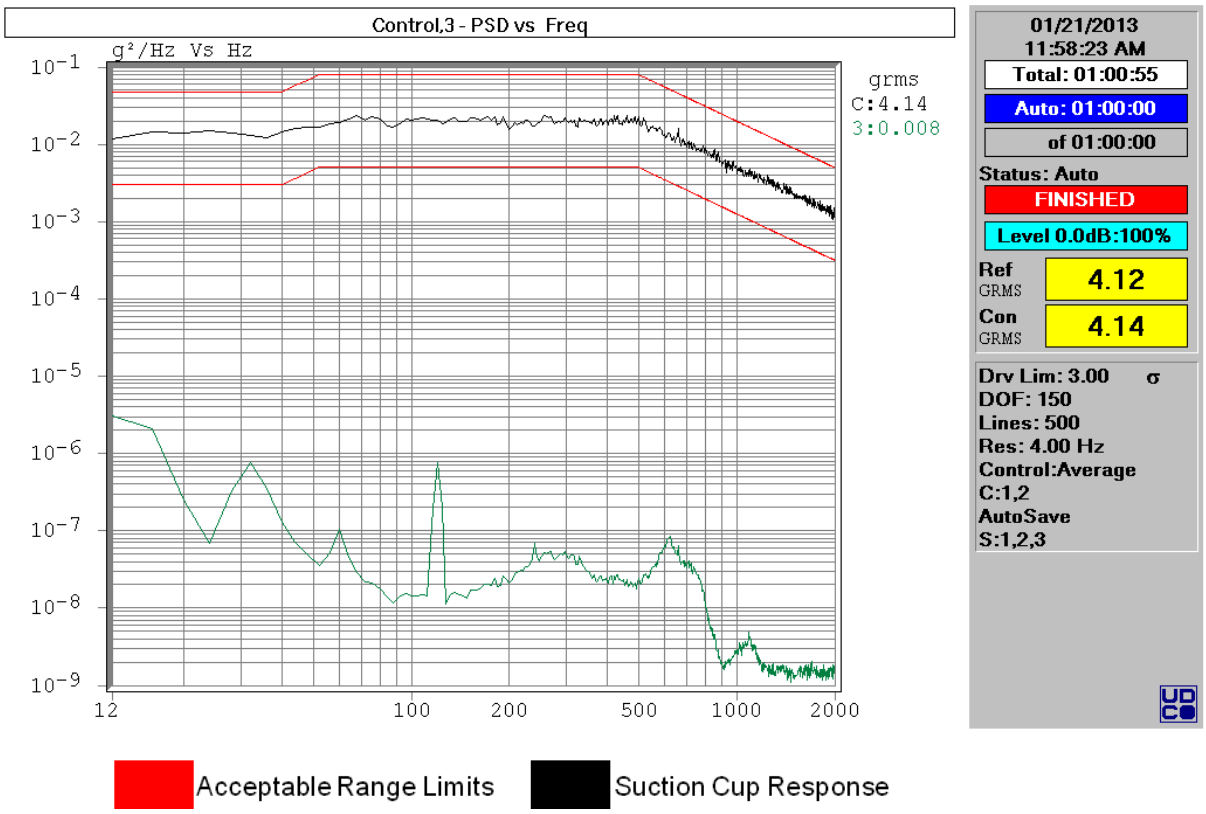
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup C
IPad installed
Side to Side Axis
Random Curve C
RUN NAME: run6
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

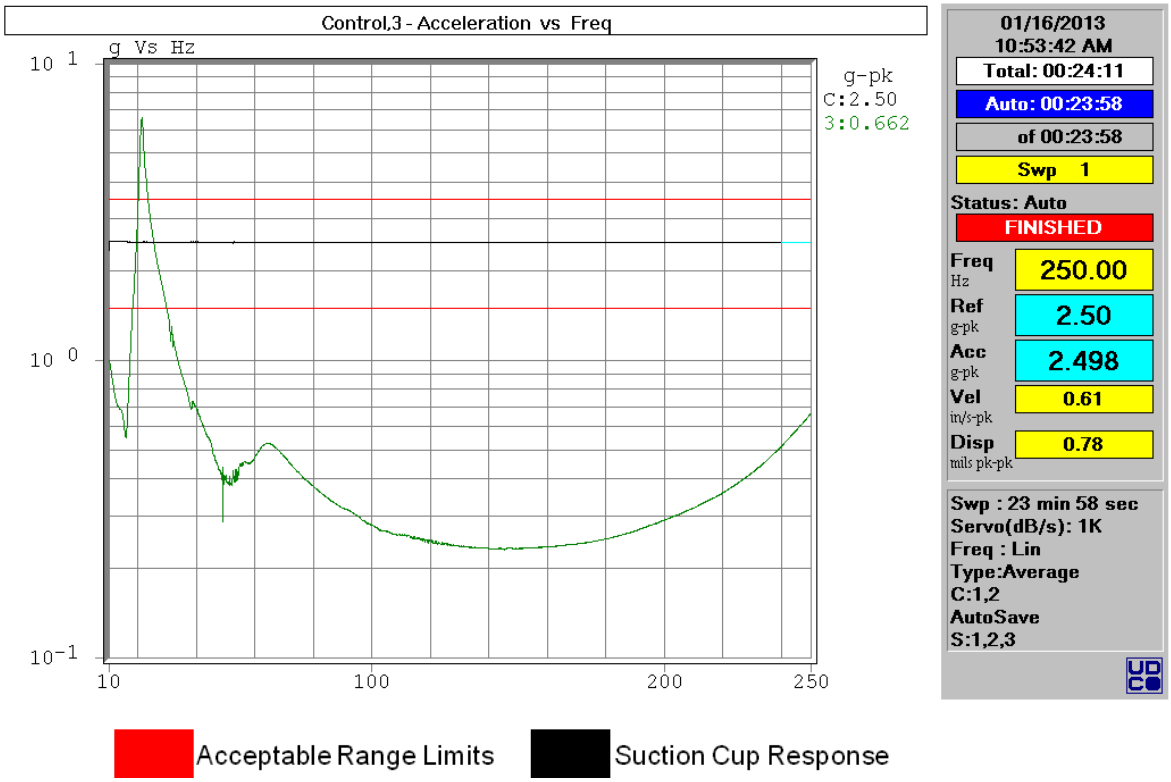
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup C
IPad Installed
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS1
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup C
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS41
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

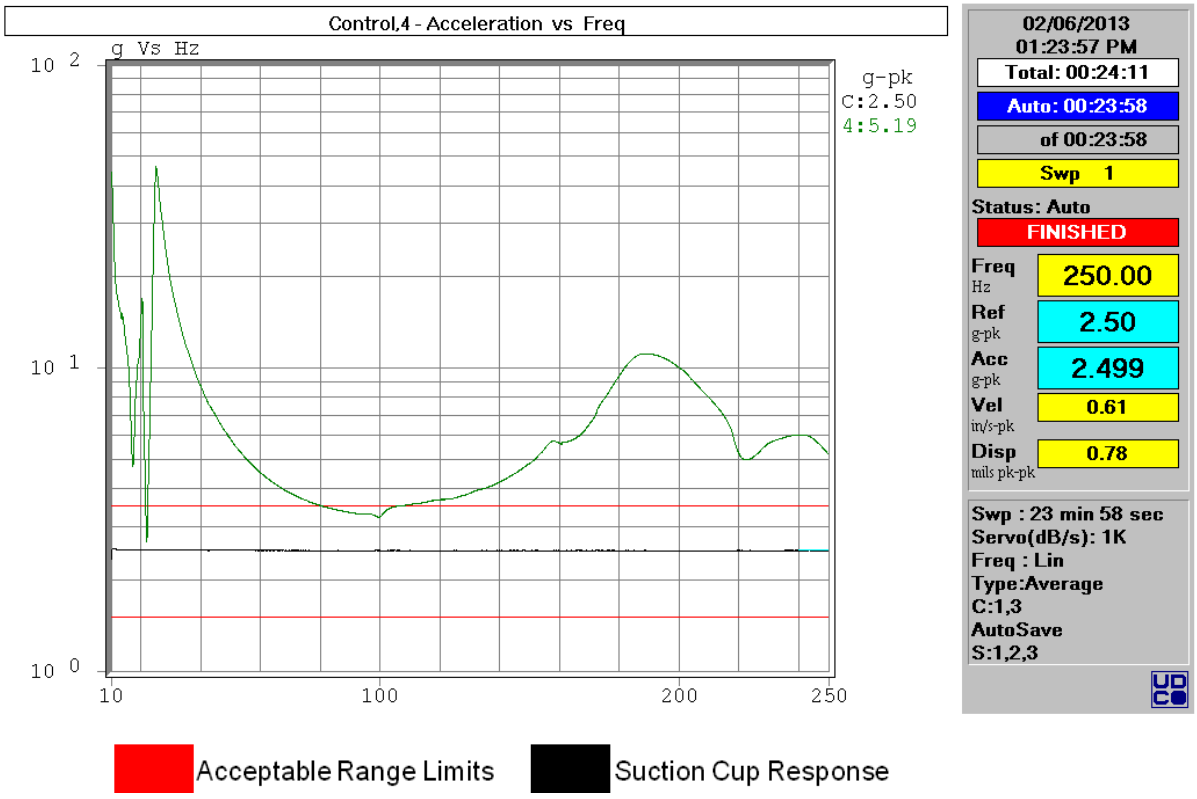
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup C
Dummy Load for IPad Installed
Cleaned windshield with cleaner prior to run
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS19
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

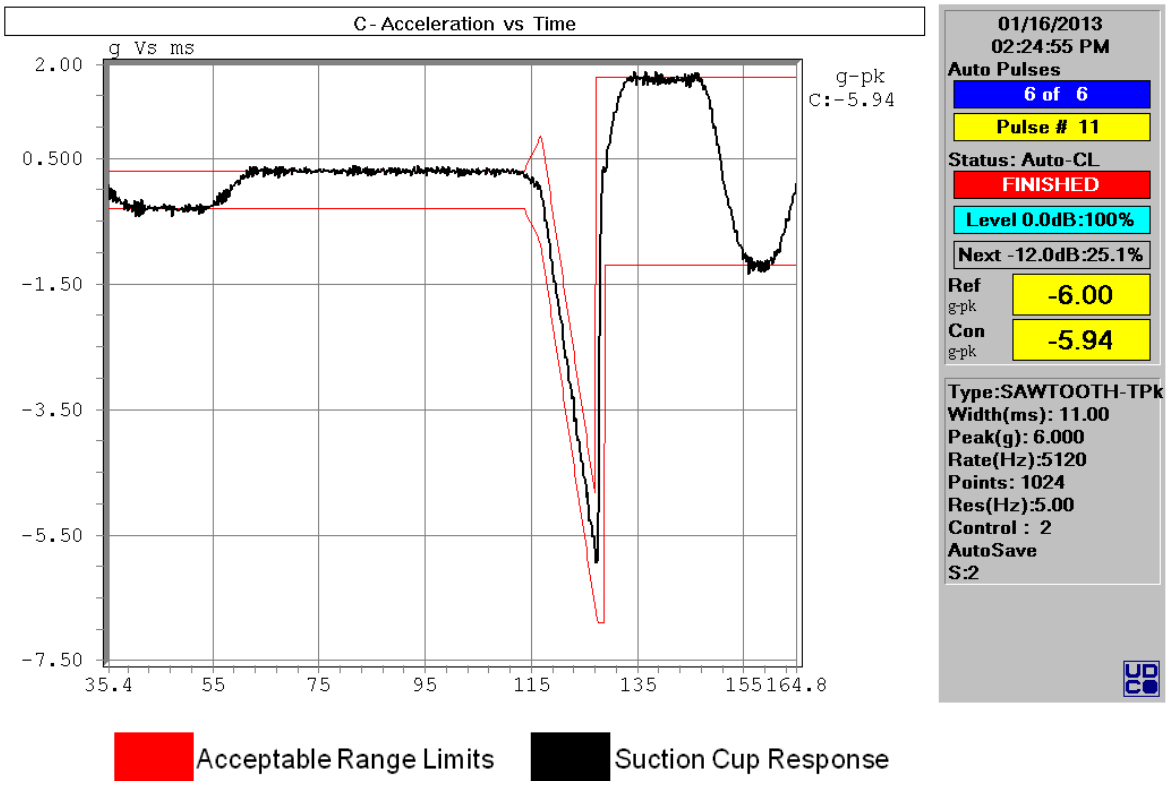
UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup C - Vertical Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup C
Op Shock 6 G's 11 ms
RUN NAME: run6
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

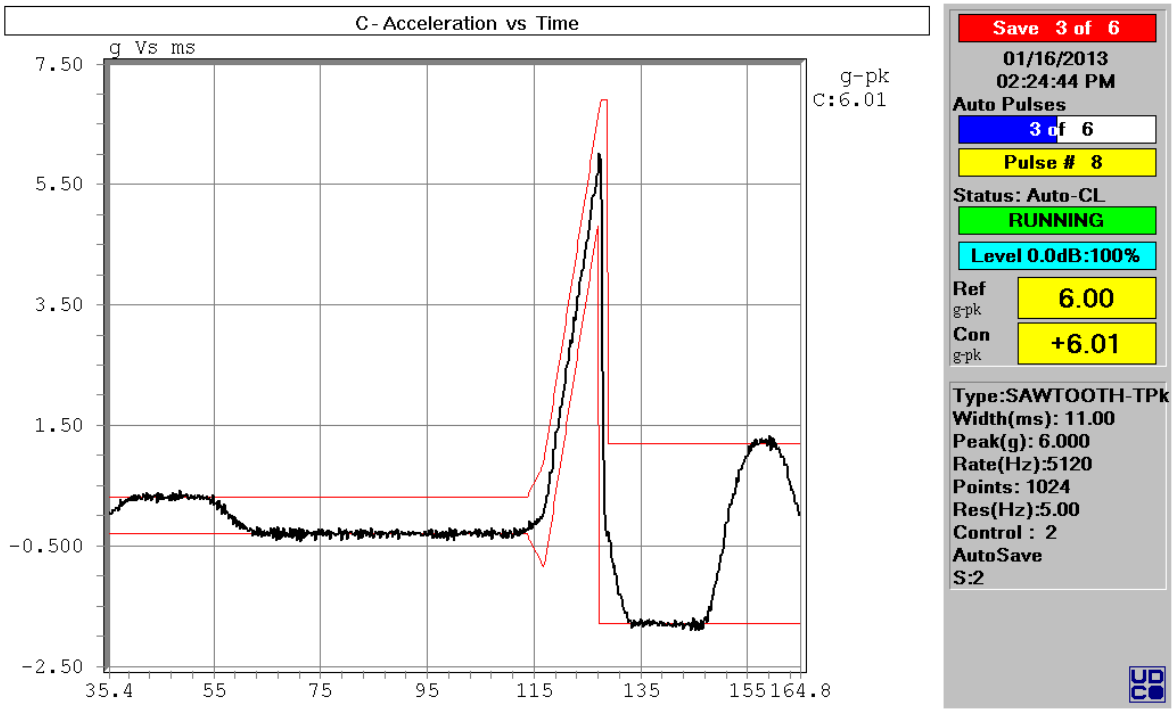
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup C
Op Shock 6 G's 11 ms
RUN NAME: run6
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

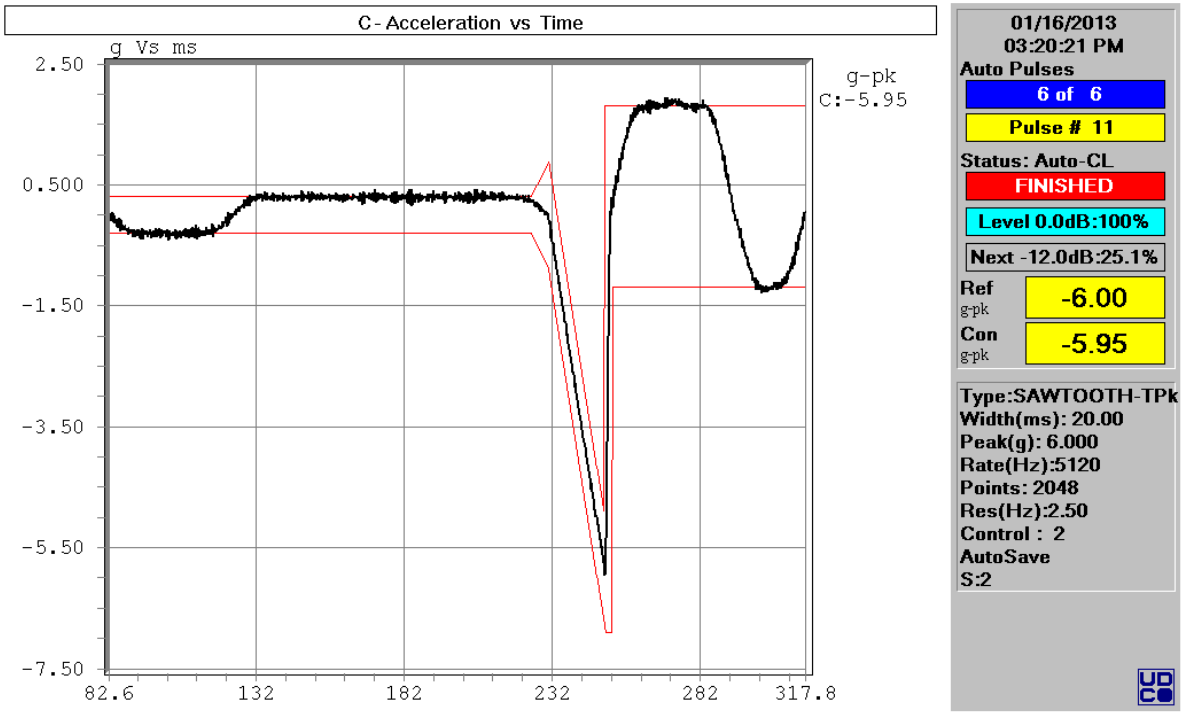
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup C
Op Shock 6 G's 20 ms
RUN NAME: run7
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

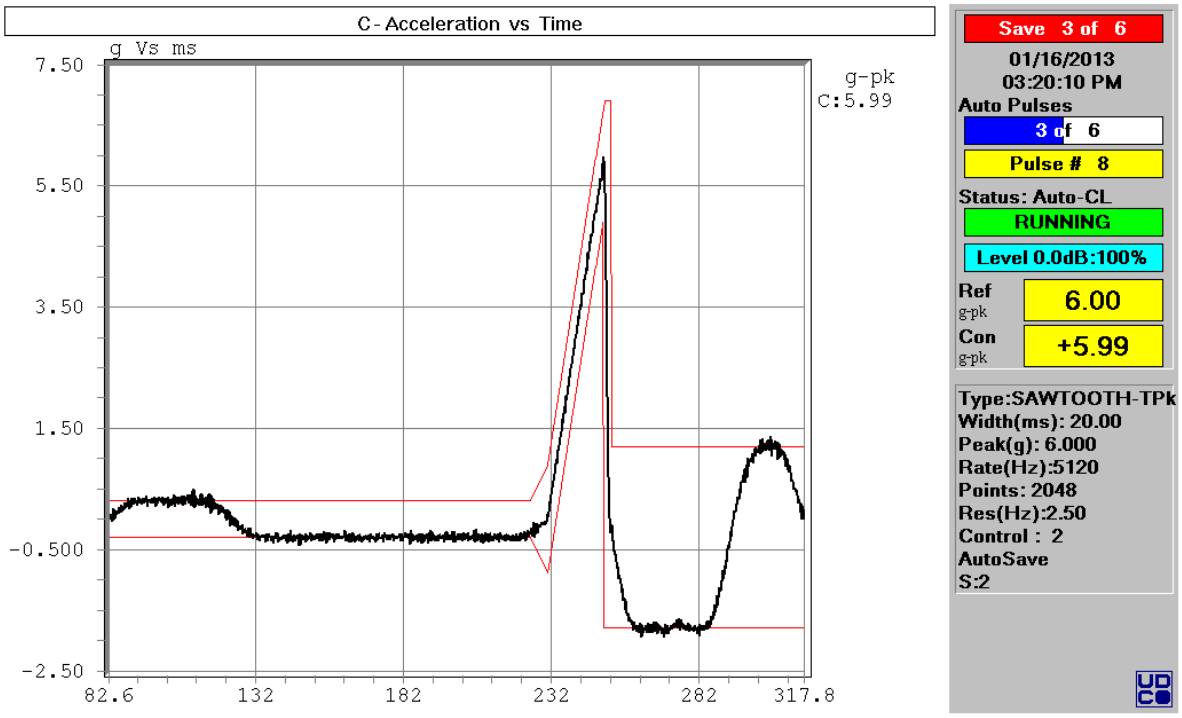
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup C
Op Shock 6 G's 20 ms
RUN NAME: run7
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

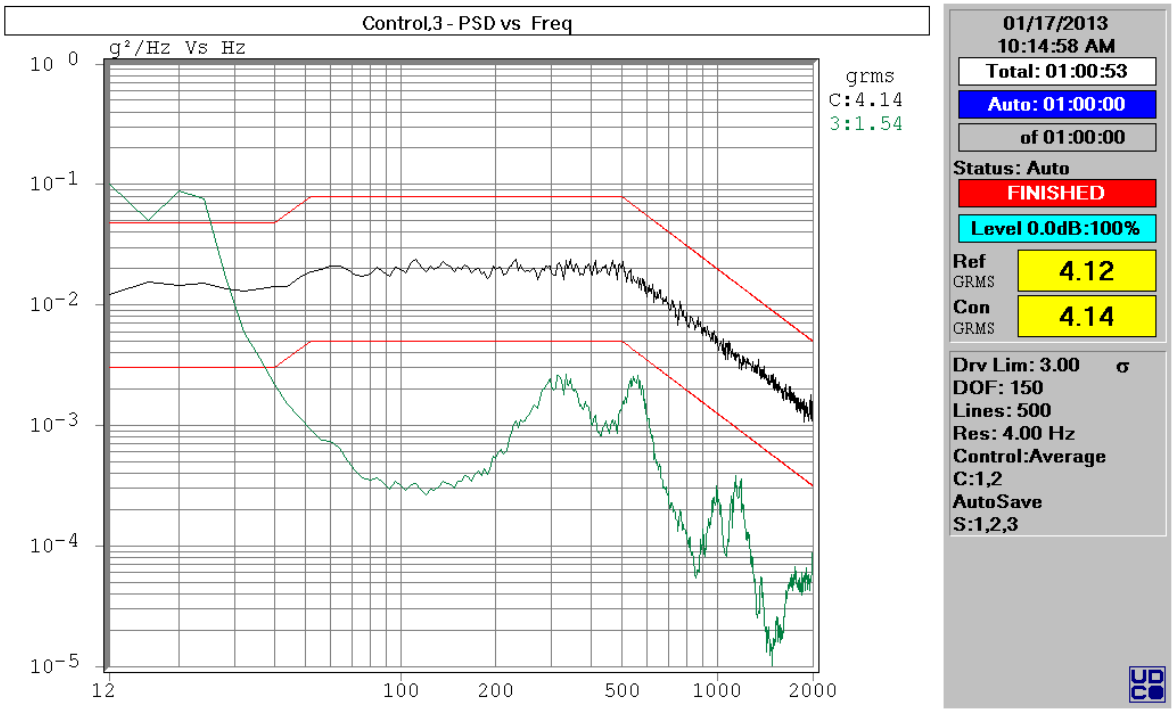
TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C
Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup C
IPad installed
Vertical Axis
Random Curve C
RUN NAME: run2
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

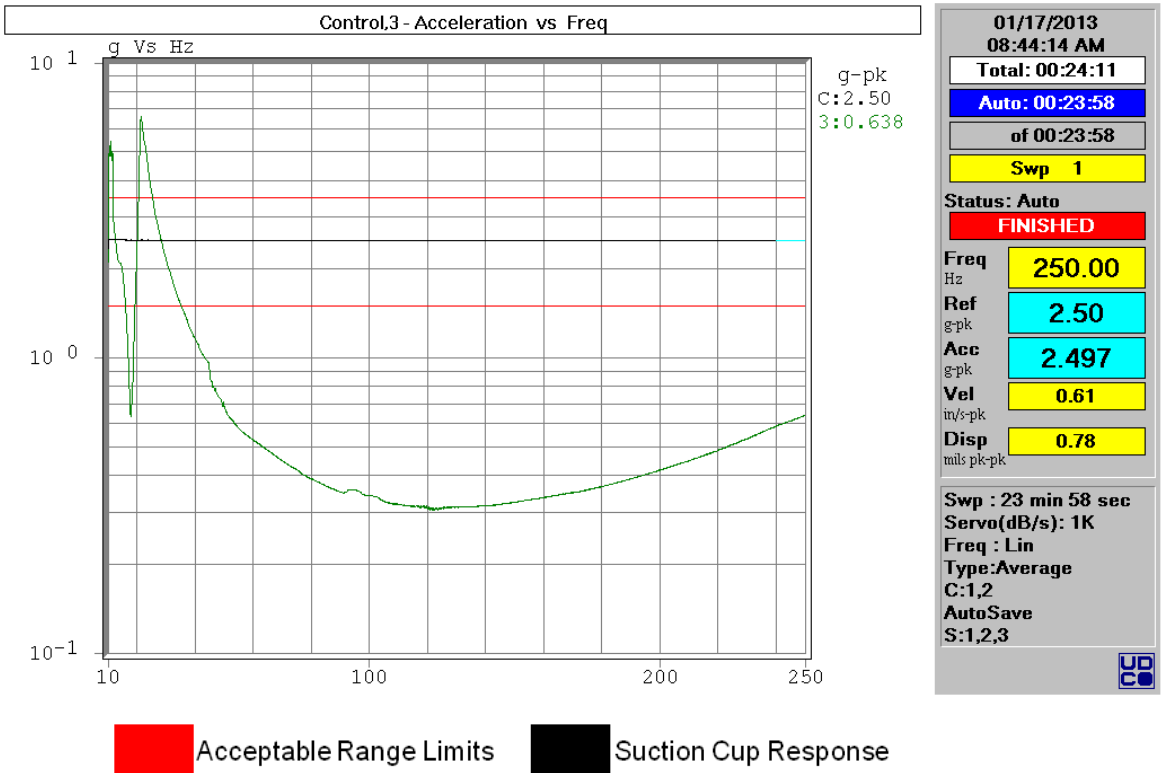
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup C
IPad Installed
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS2
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

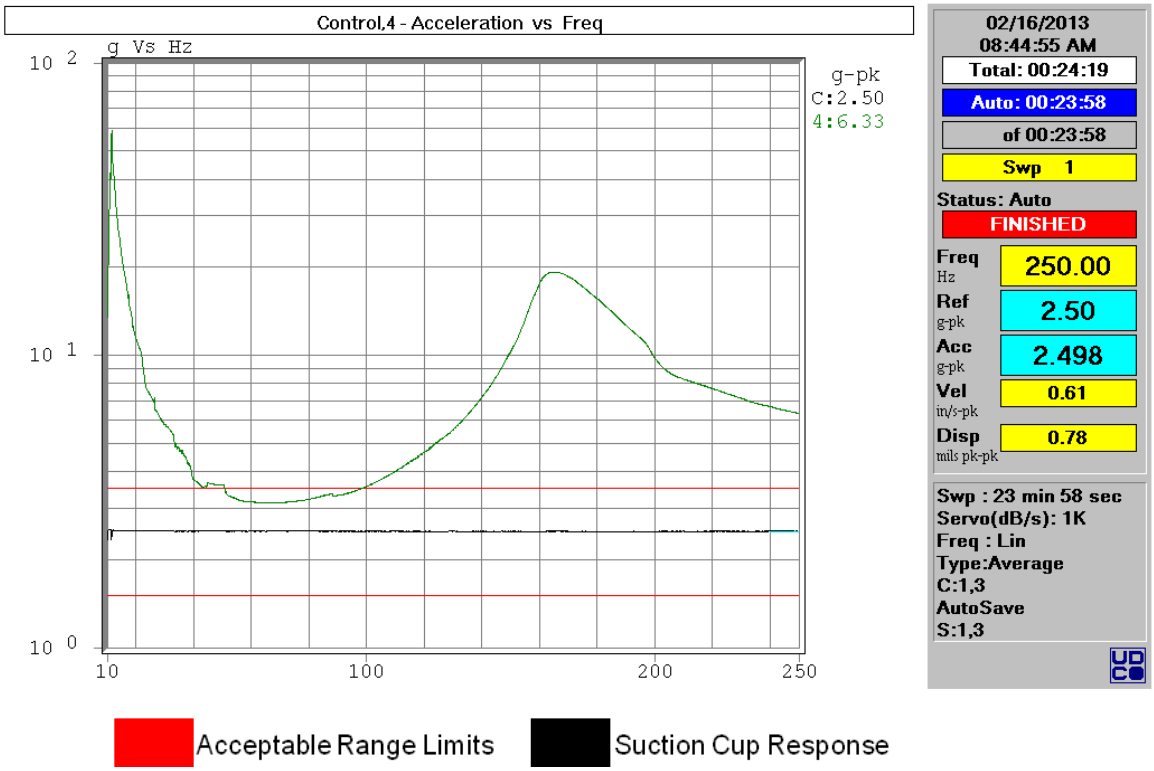
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup C
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS46
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS
START LEVEL: -12.00 dB, (25.12% of full level)

TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup C
Ipad Installed
Cleaned windshield with cleaner prior to run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS28
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

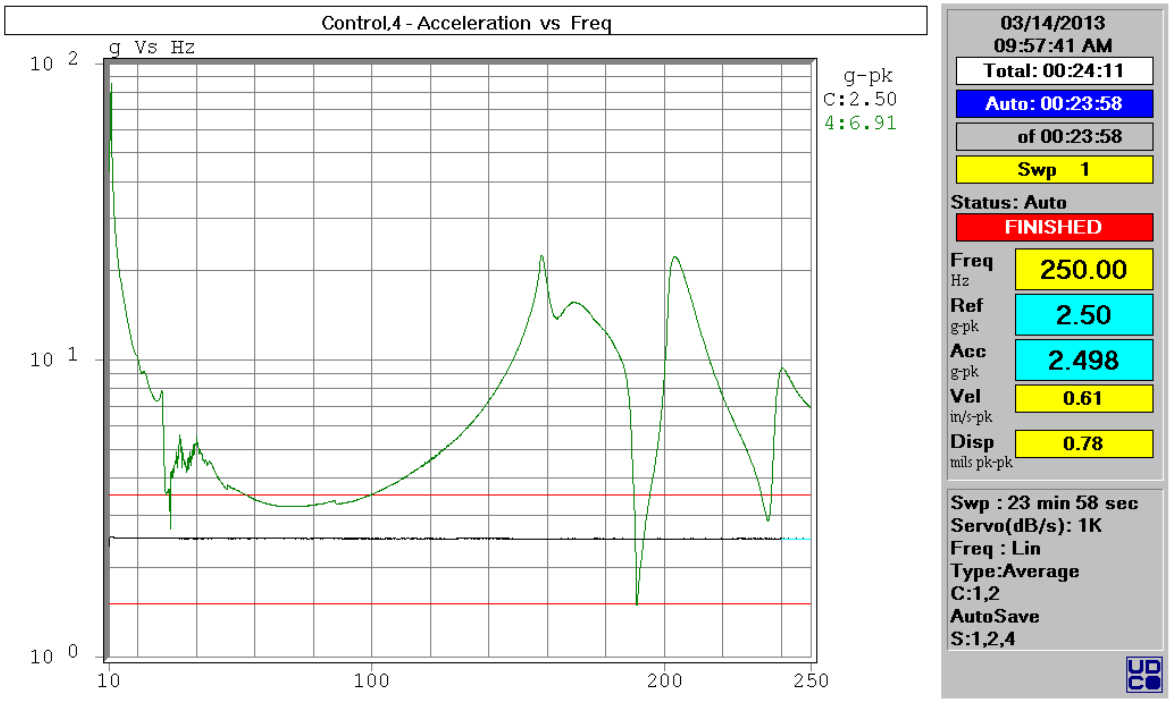
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Painted Surface

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup C
Ipad Plate Installed
Painted Surface
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS51
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Dust on Windscreen

Suction Cup C fell off of the plastic windshield before vibration could be started (About 10 minutes after attachment).

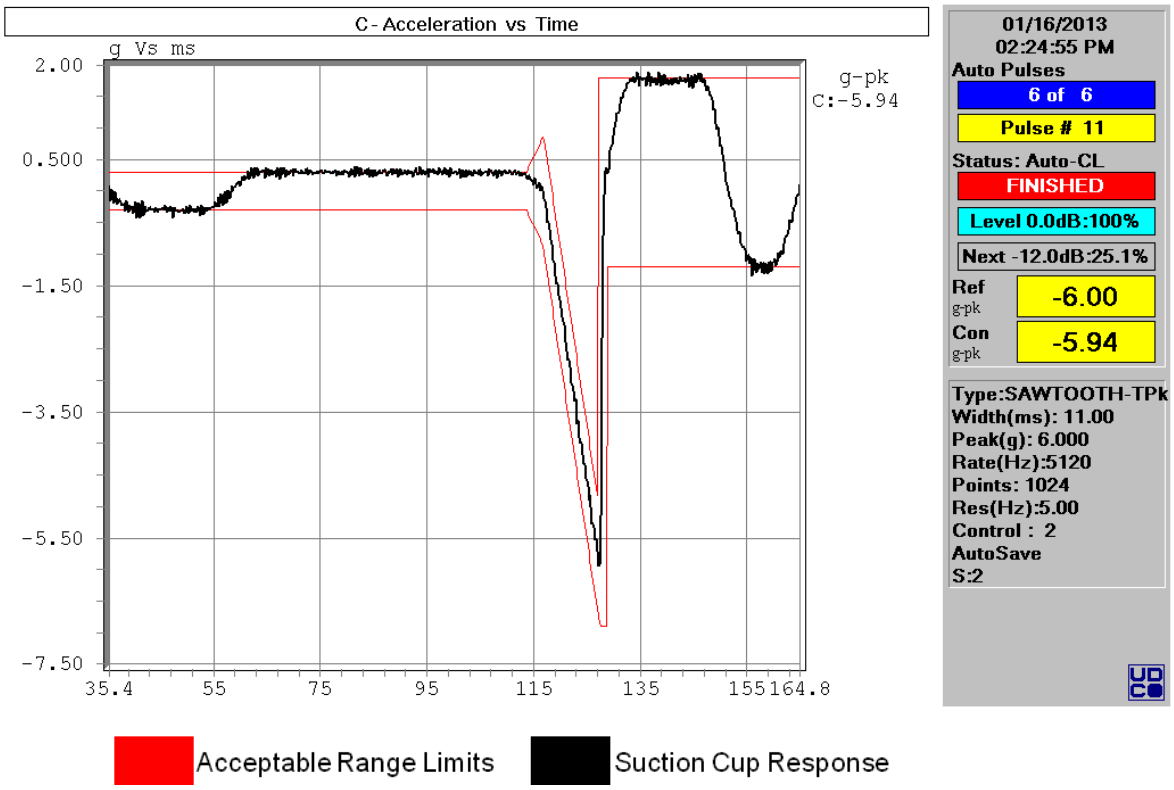
Suction Cup D

Suction Cup D – Front to Back Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup D
Op Shock 6 G's 11 ms
RUN NAME: run6
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

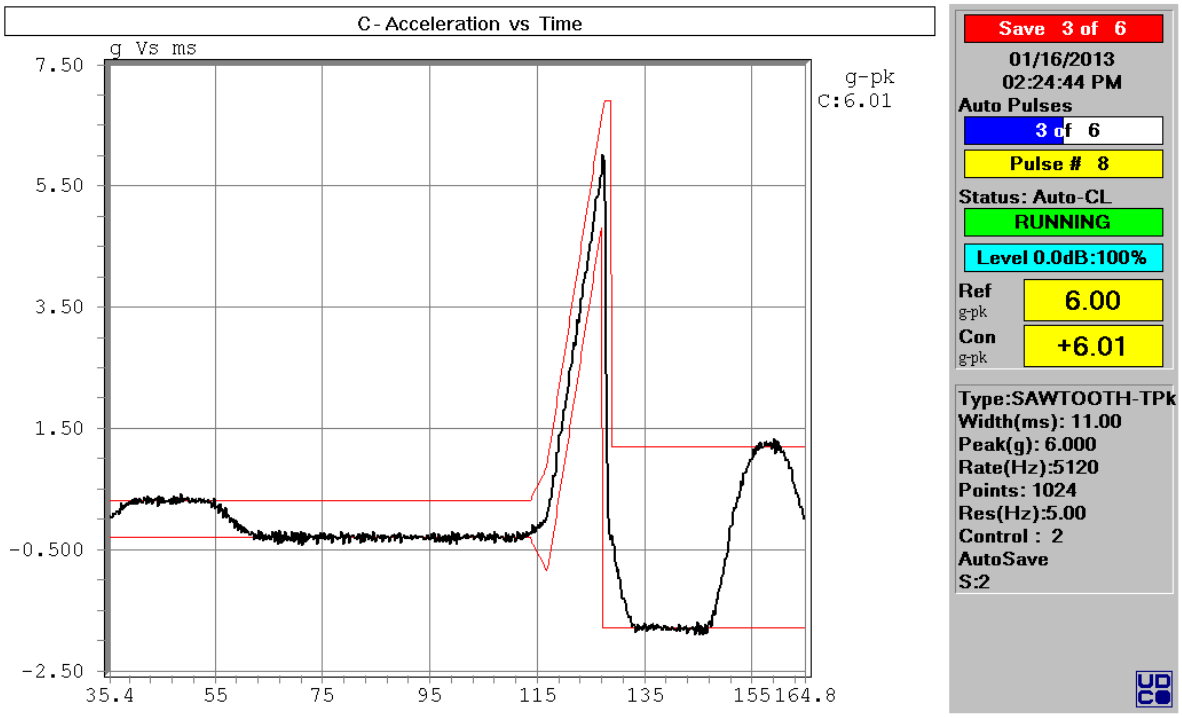
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup D
Op Shock 6 G's 11 ms
RUN NAME: run6
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

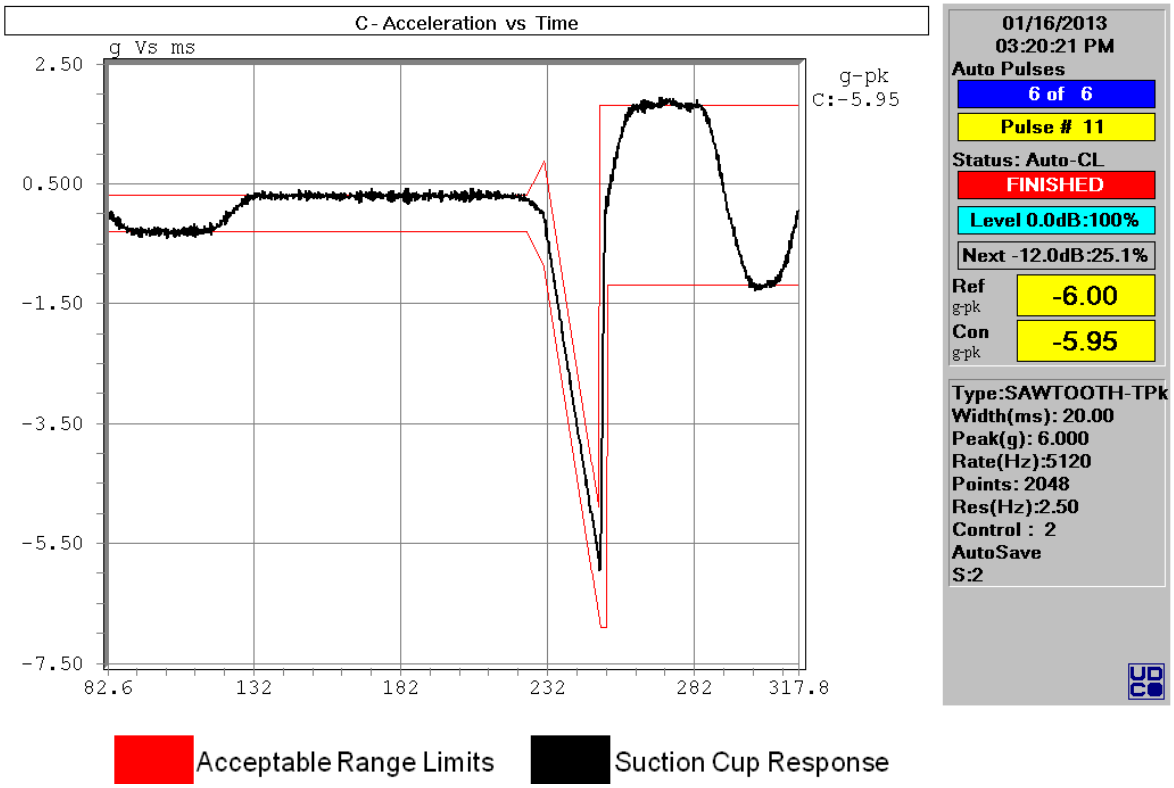
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup D
Op Shock 6 G's 20 ms
RUN NAME: run7
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	**Level (dB)**	**Level (%)**	**Pulses #**	**Polarity (+/-)**	**Delay (ms)**	**Mode (O/C)**
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

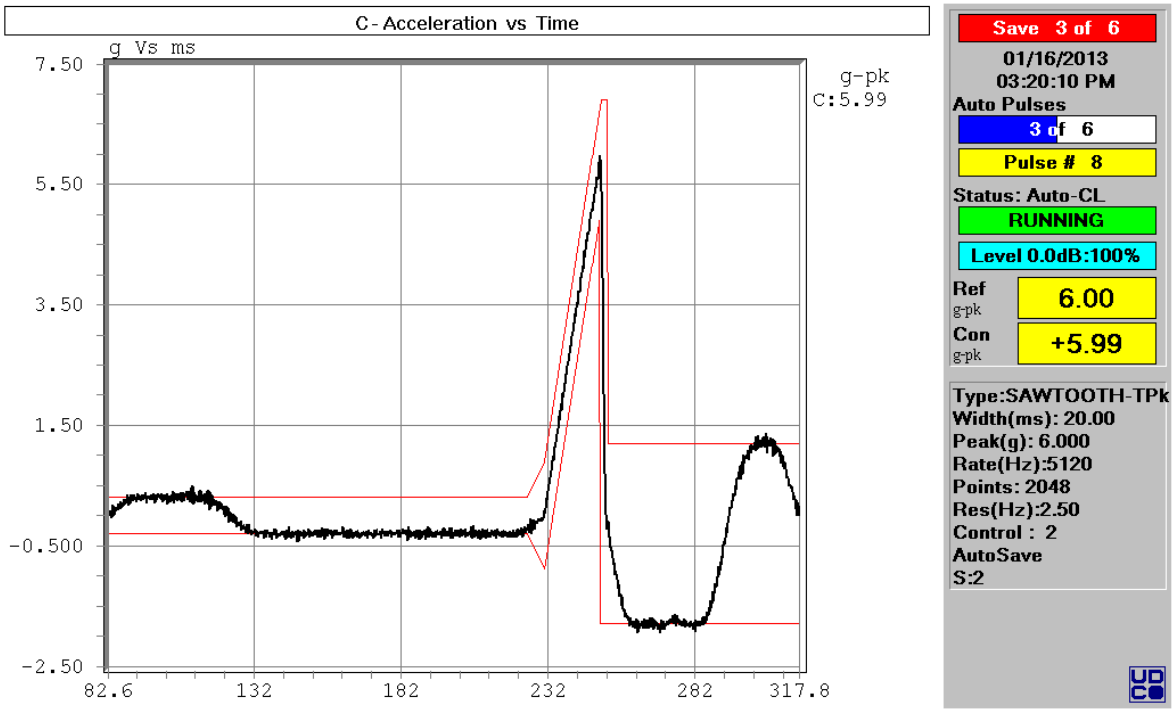
Seq#	**From**	**To**	**# Times**
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup D
Op Shock 6 G's 20 ms
RUN NAME: run7
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

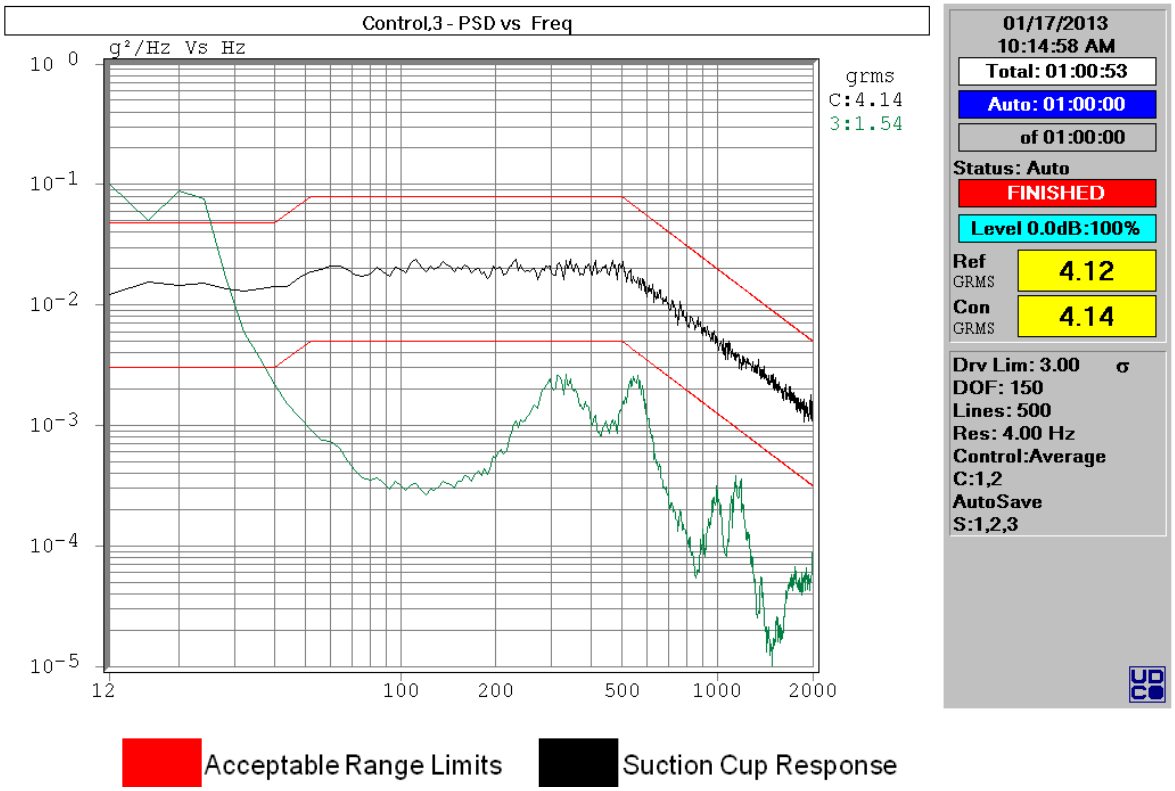
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup D
IPad installed
Vertical Axis
Random Curve C
RUN NAME: run2
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

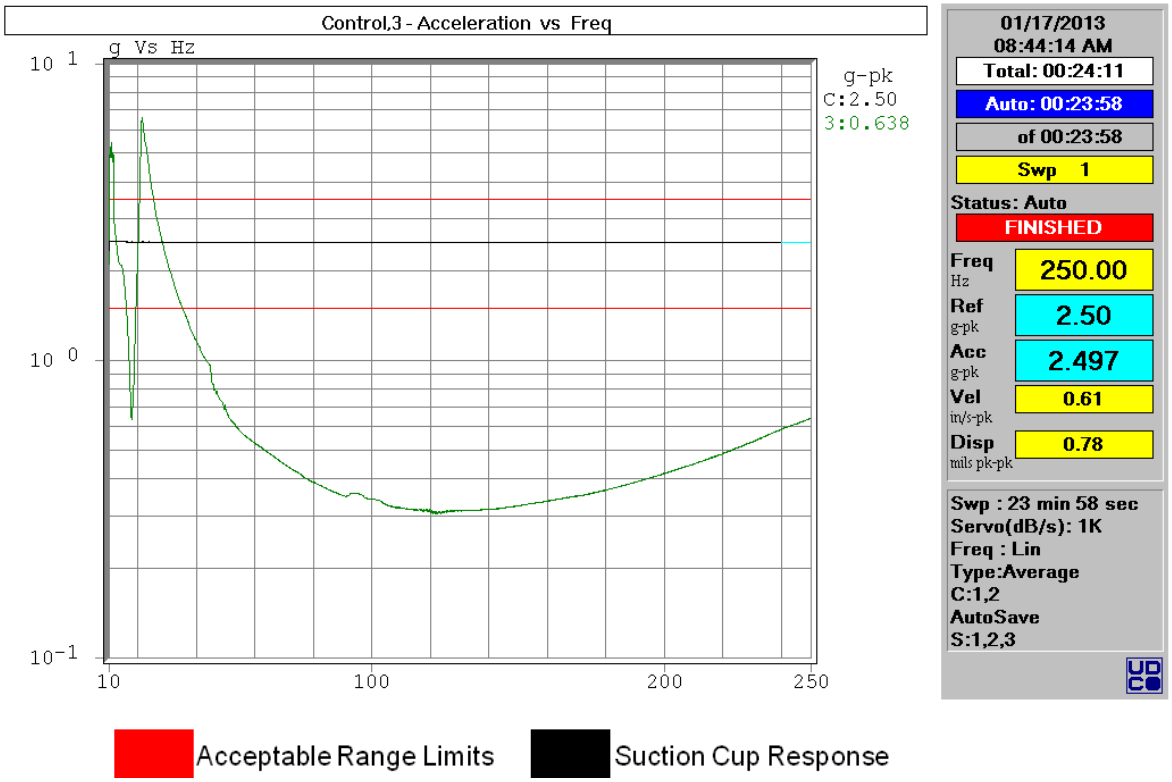
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup D
IPad Installed
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS2
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

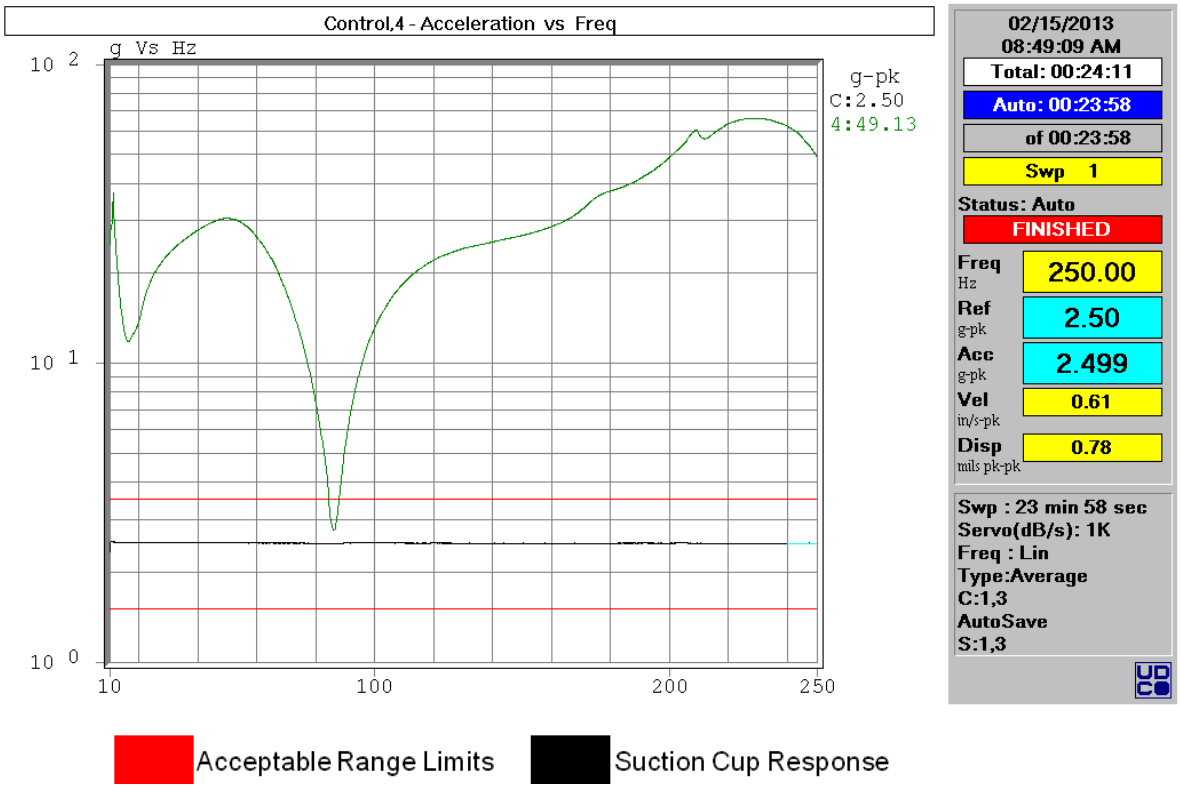
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup D
Phone Installed
Chicken Oil Applied to Windshield Prior to Run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS37
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup D
Phone Installed
Cleaned windshield with cleaner prior to run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS28
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

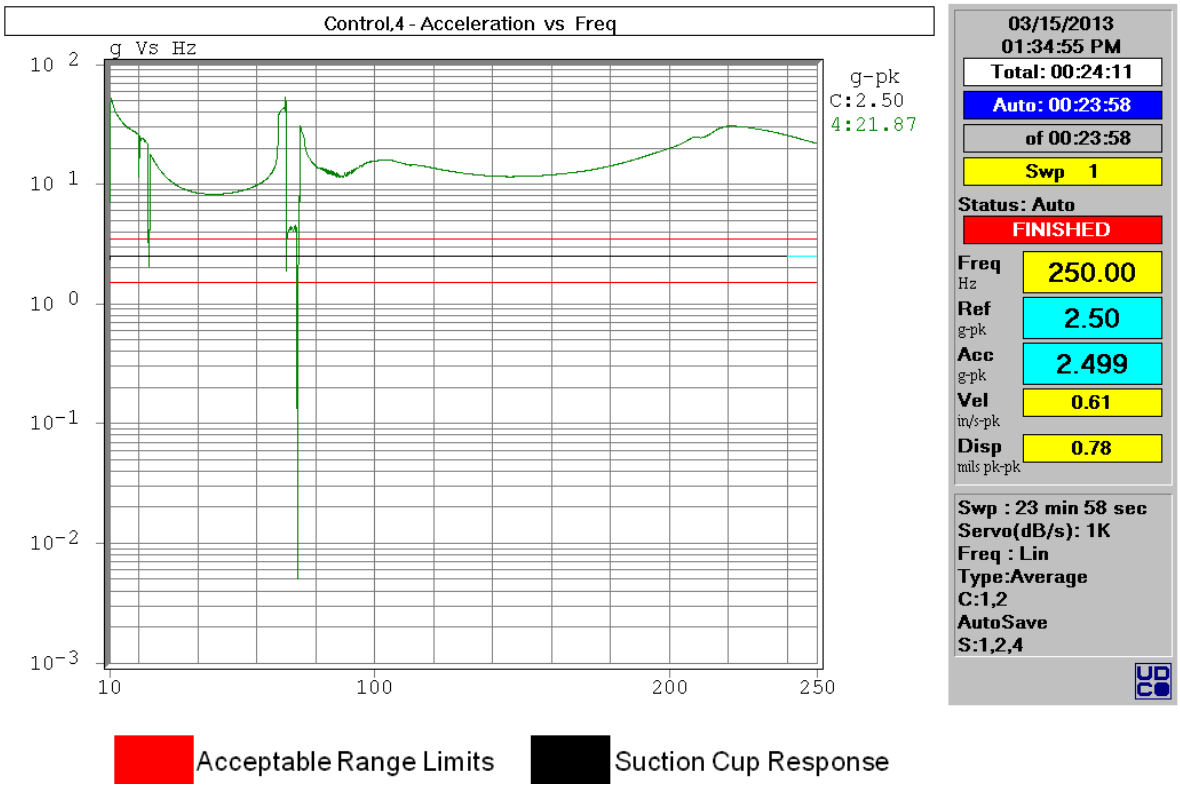
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Painted Surface

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup D
Phone Installed
Painted Surface Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS59
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

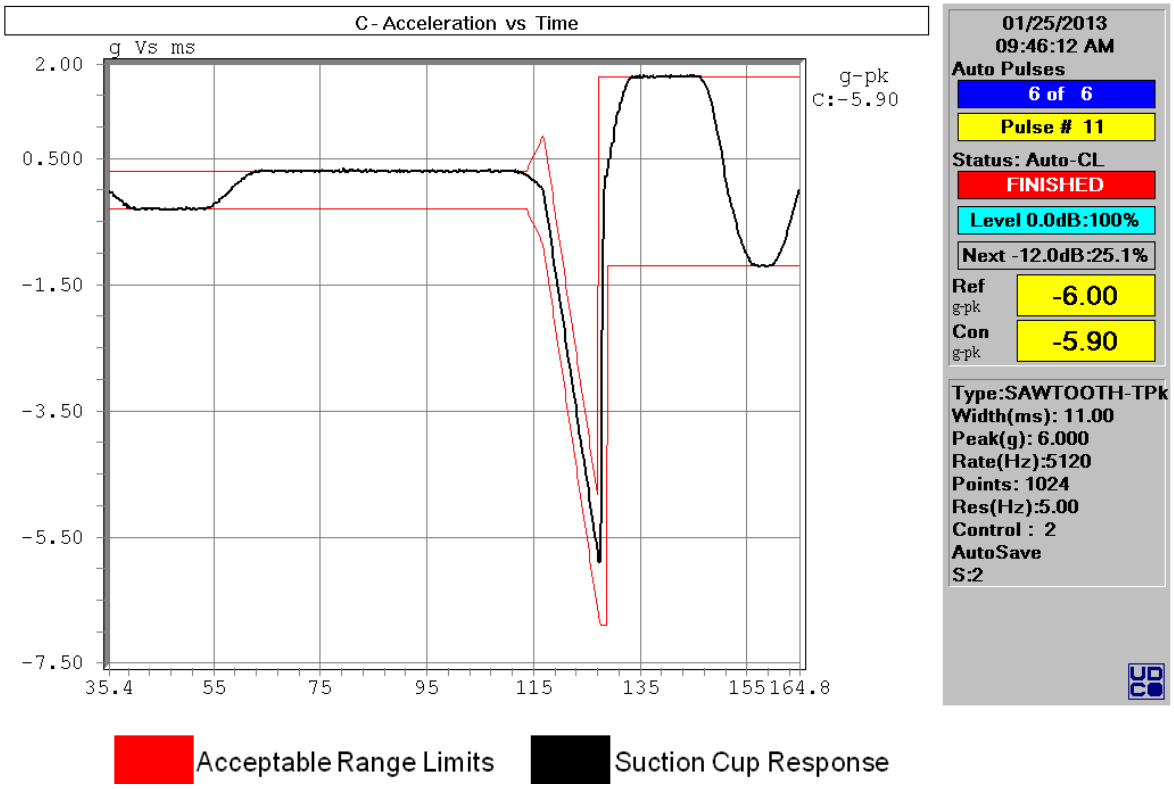
UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup D – Side to Side Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: (Lobster) Suction Cup D
Op Shock 6 G's 11 ms
Side to Side Axis
RUN NAME: run18
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

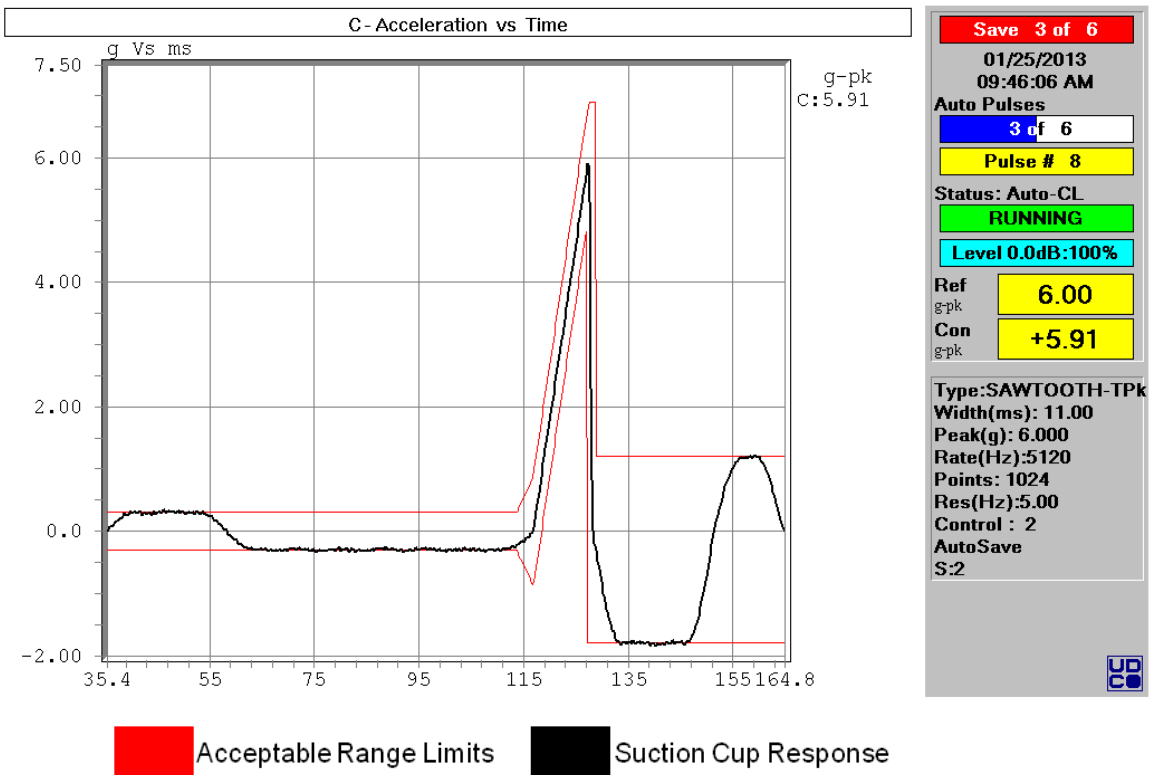
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: (Lobster) Suction Cup D
Op Shock 6 G's 11 ms
Side to Side Axis
RUN NAME: run18
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

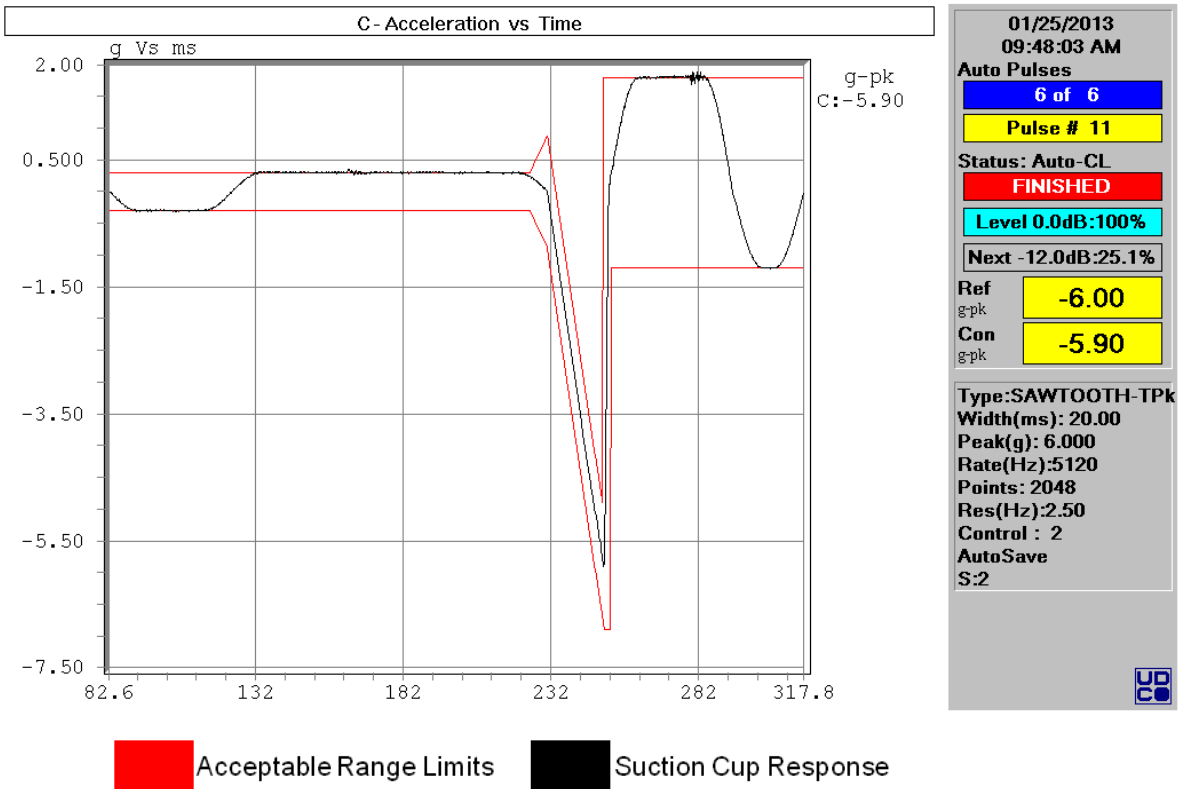
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
(Lobster) Suction Cup D
Op Shock 6 G's 20 ms
RUN NAME: run16
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

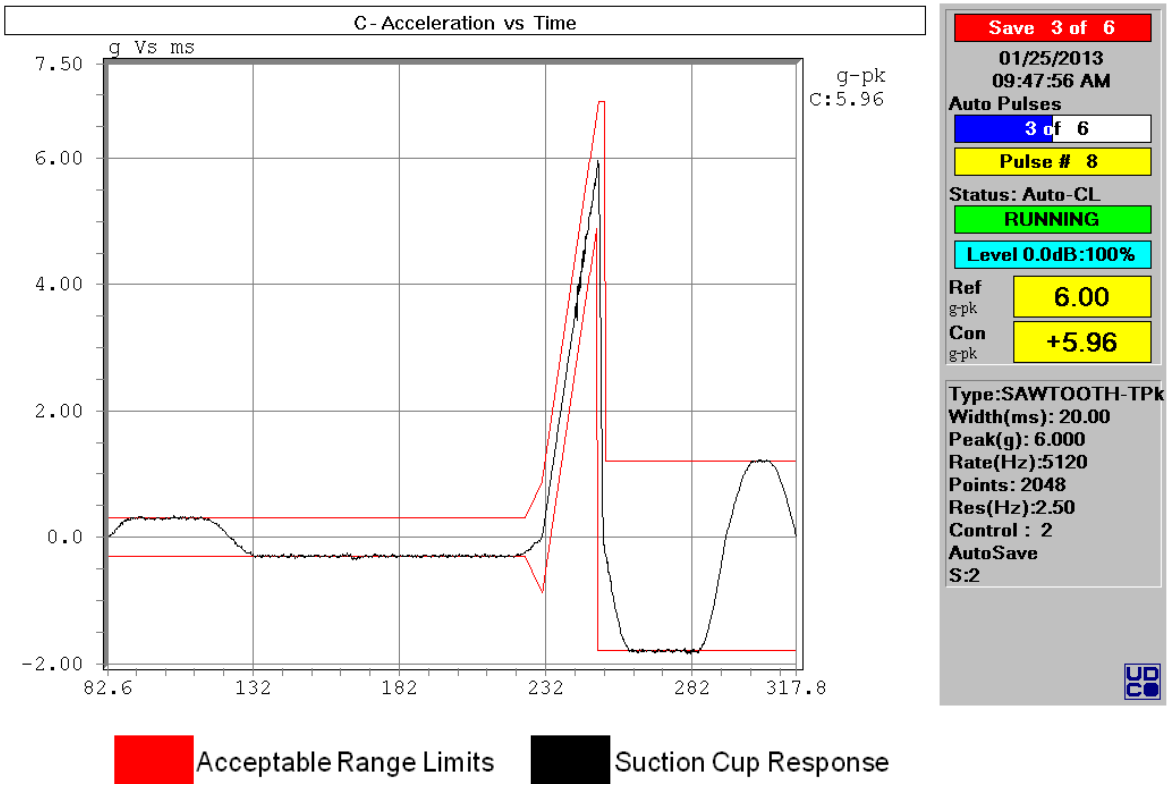
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
(Lobster) Suction Cup D
Op Shock 6 G's 20 ms
RUN NAME: run16
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

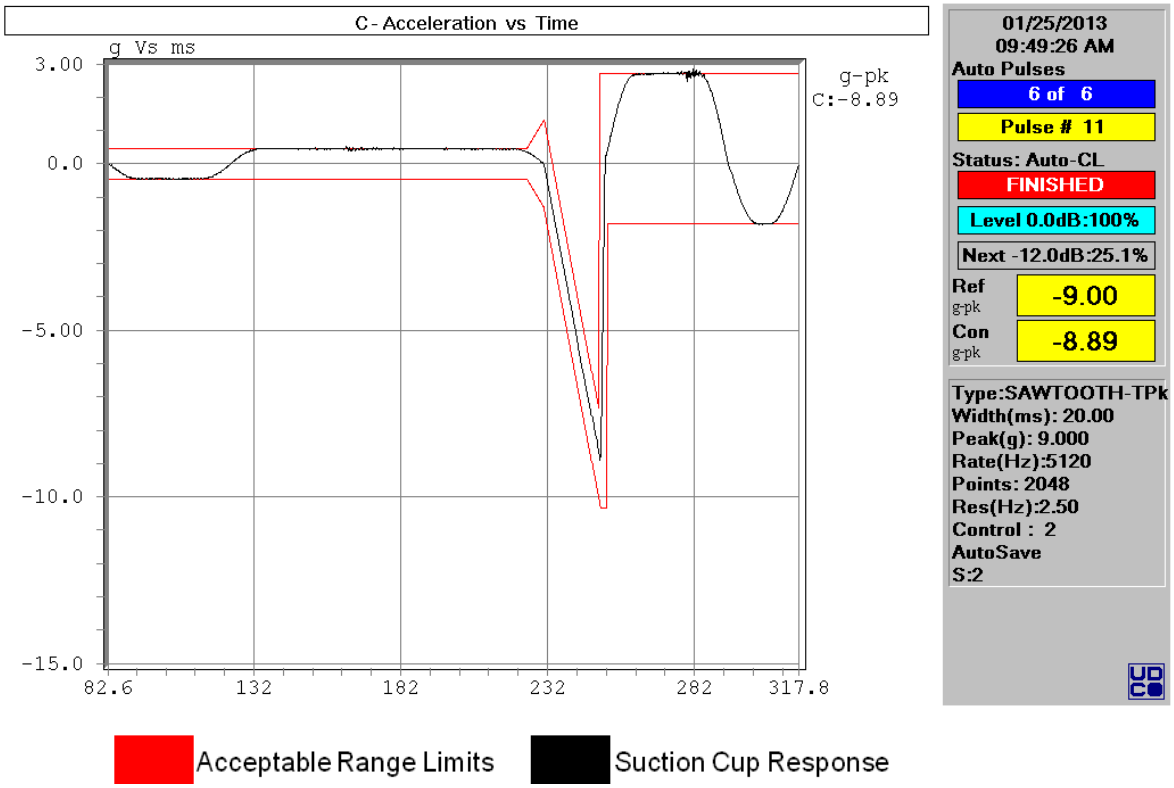
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

9G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
(Lobster) Suction Cup D
Op Shock 9 G's 20 ms
RUN NAME: run17
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 9.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	**Level (dB)**	**Level (%)**	**Pulses #**	**Polarity (+/-)**	**Delay (ms)**	**Mode (O/C)**
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

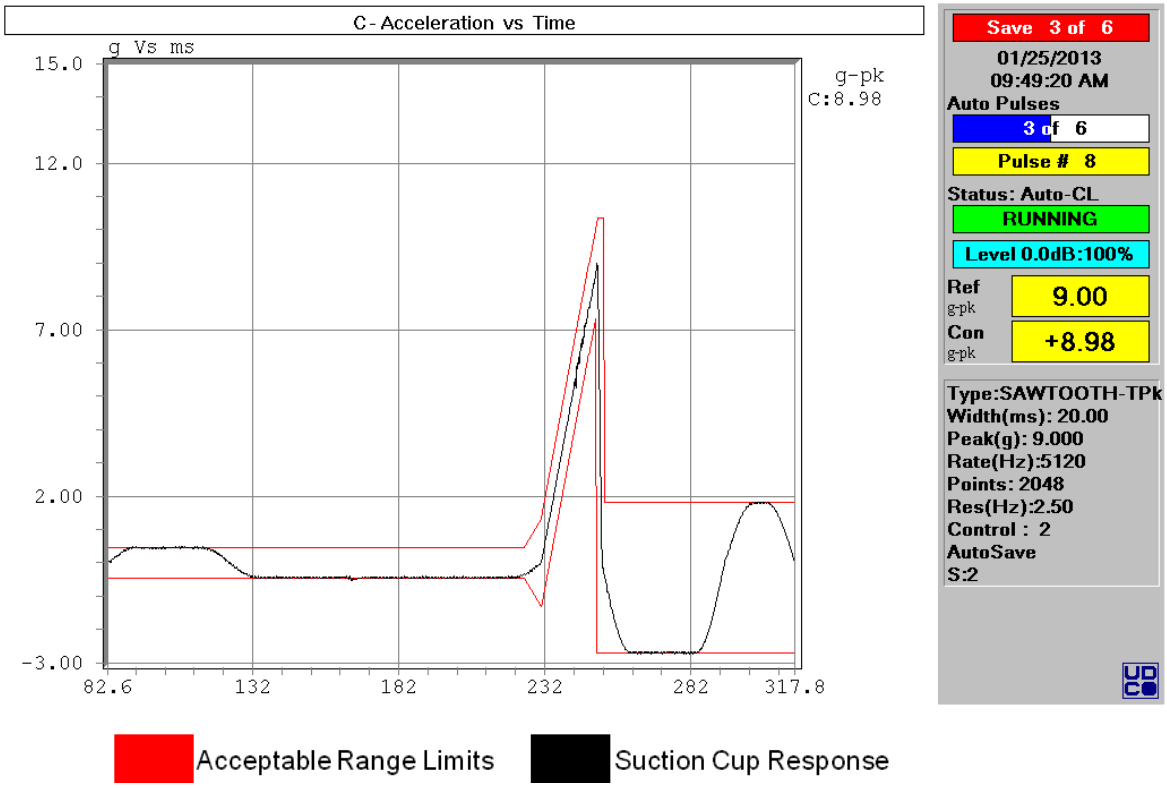
Seq#	**From**	**To**	**# Times**
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

9G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
(Lobster) Suction Cup D
Op Shock 9 G's 20 ms
RUN NAME: run17
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 9.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

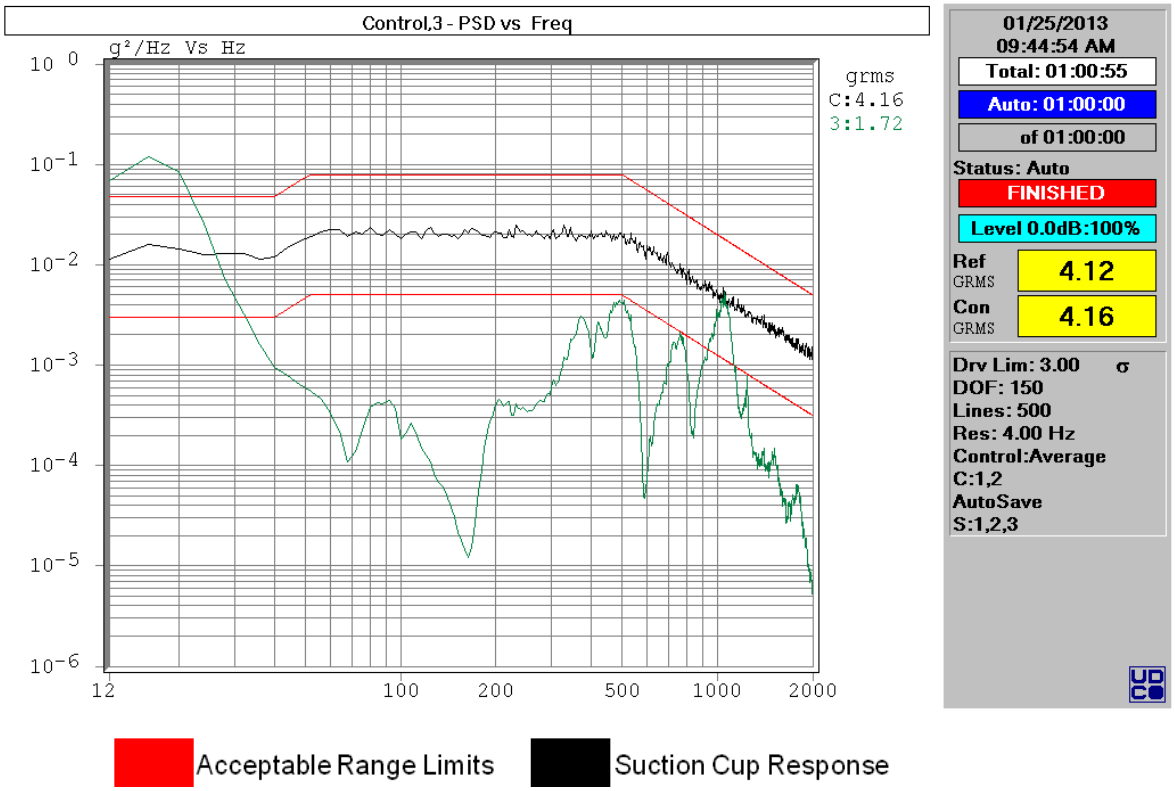
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: (Lobster) Suction Cup D
Phone Installed
Side to Side Axis
Random Curve C
RUN NAME: run13
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

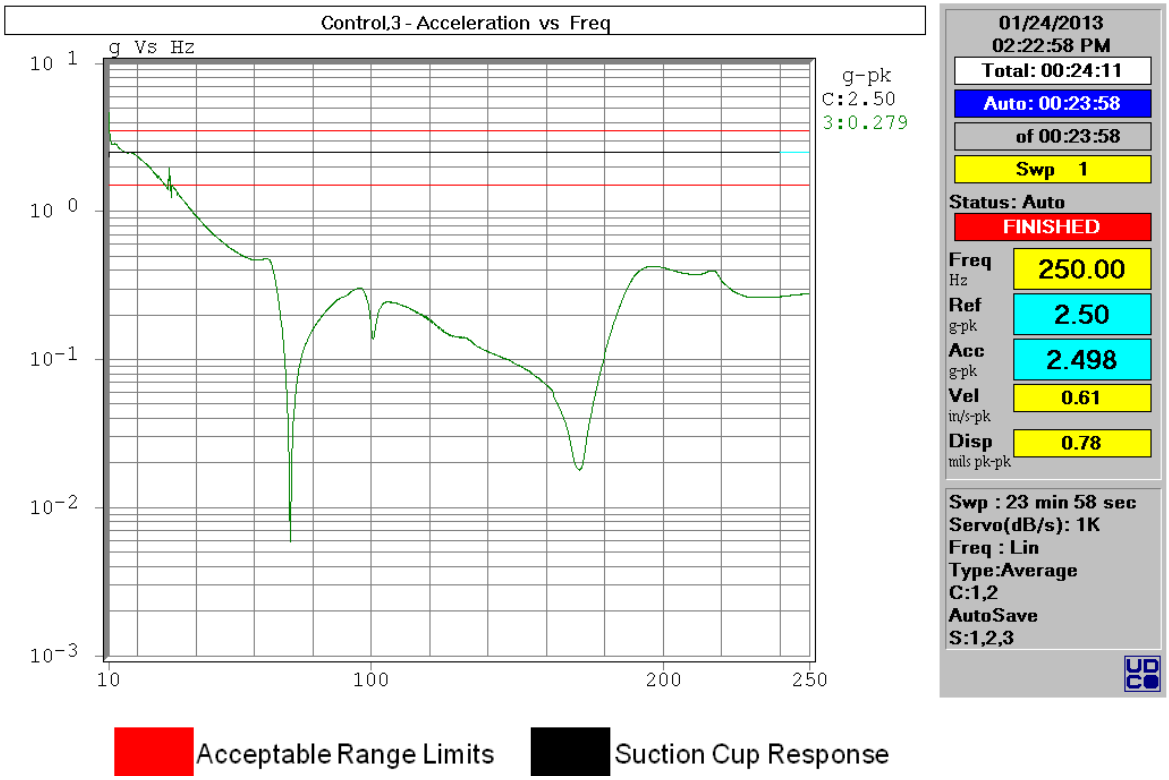
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: (Lobster) Suction Cup D
Phone Installed
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS13
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

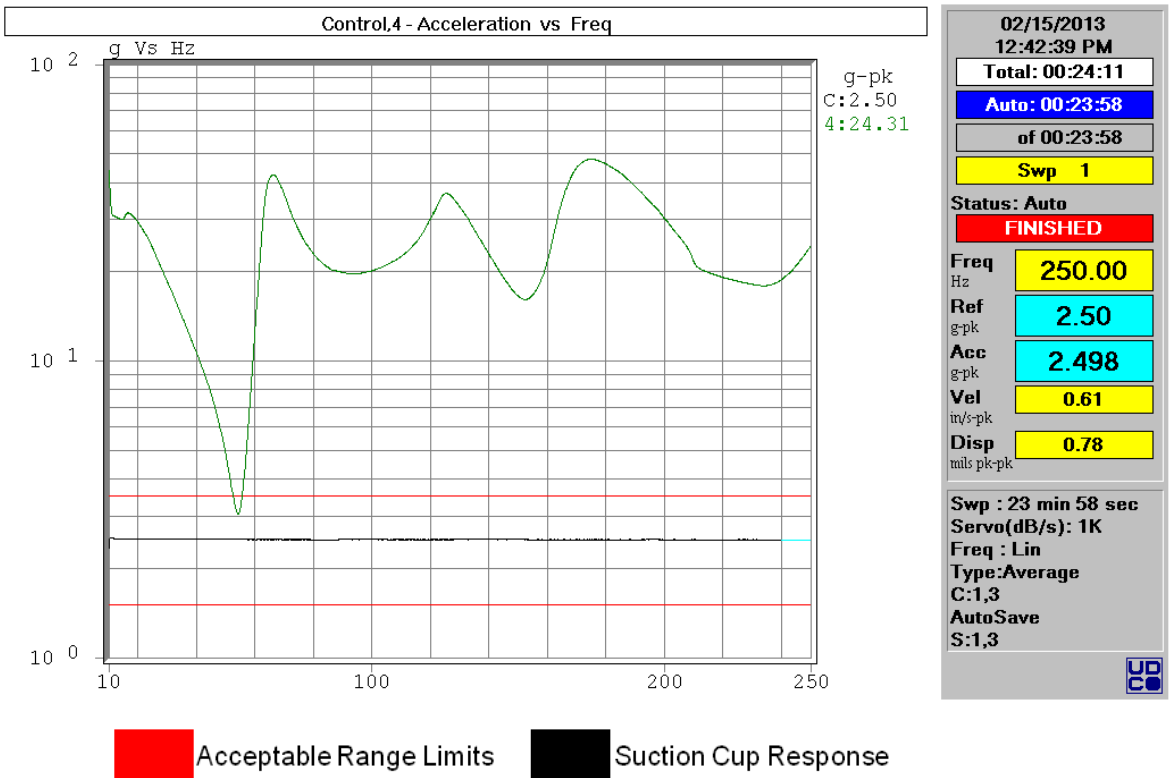
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup D
Phone Installed
Chicken Oil Applied to Windshield Prior to Run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS42
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

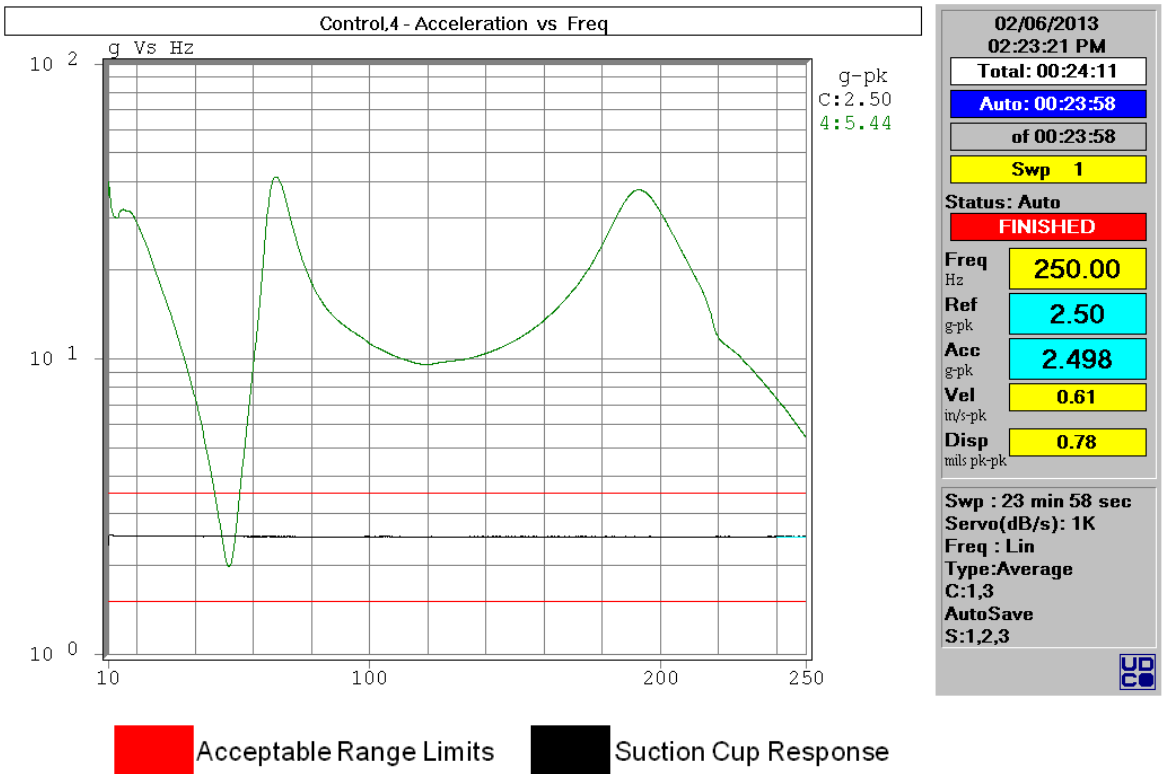
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup D
Phone Installed
Cleaned windshield with cleaner prior to run
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS20
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

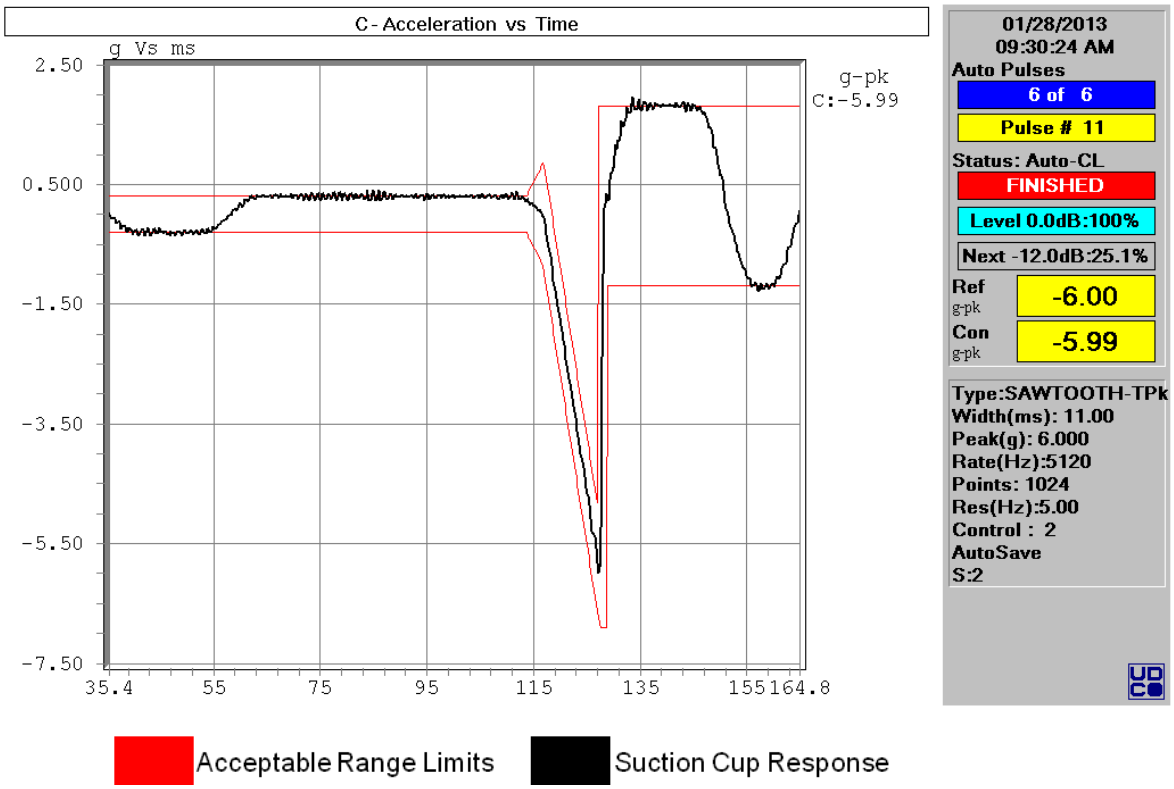
UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup D - Vertical Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: (Lobster) Suction Cup D
Op Shock 6 G's 11 ms
Vertical Axis
RUN NAME: run19
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

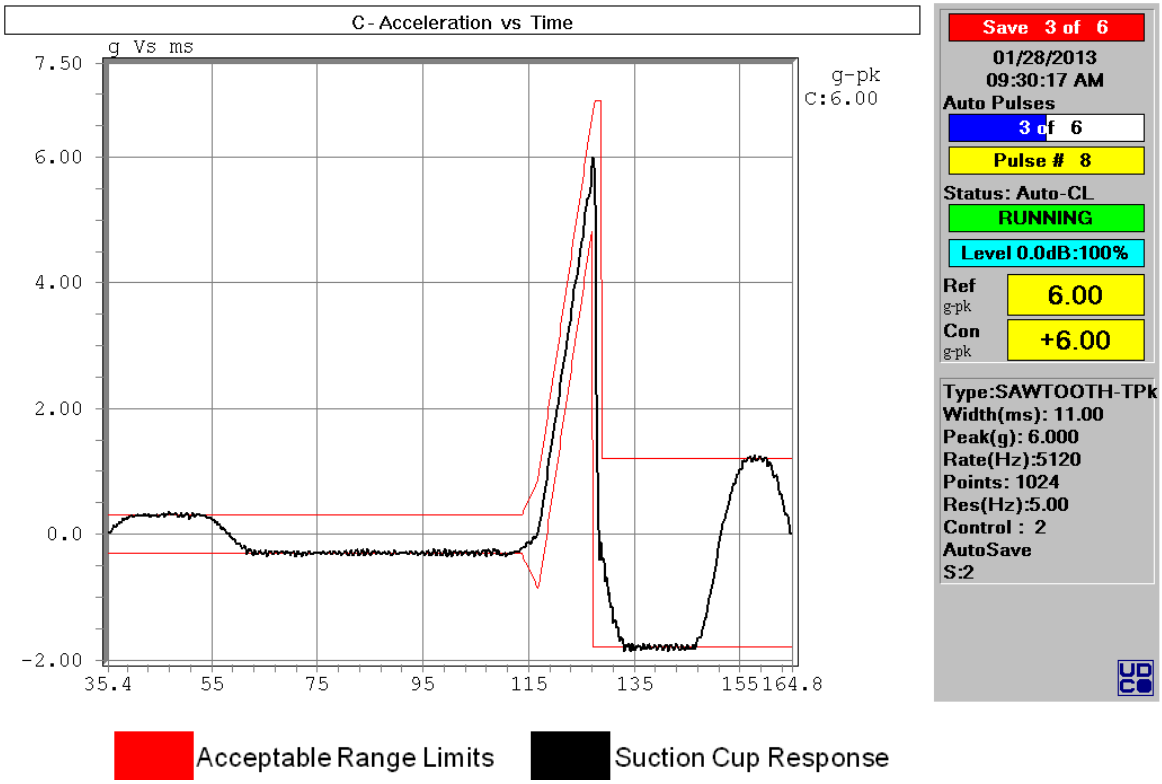
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: (Lobster) Suction Cup D
Op Shock 6 G's 11 ms
Vertical Axis
RUN NAME: run19
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

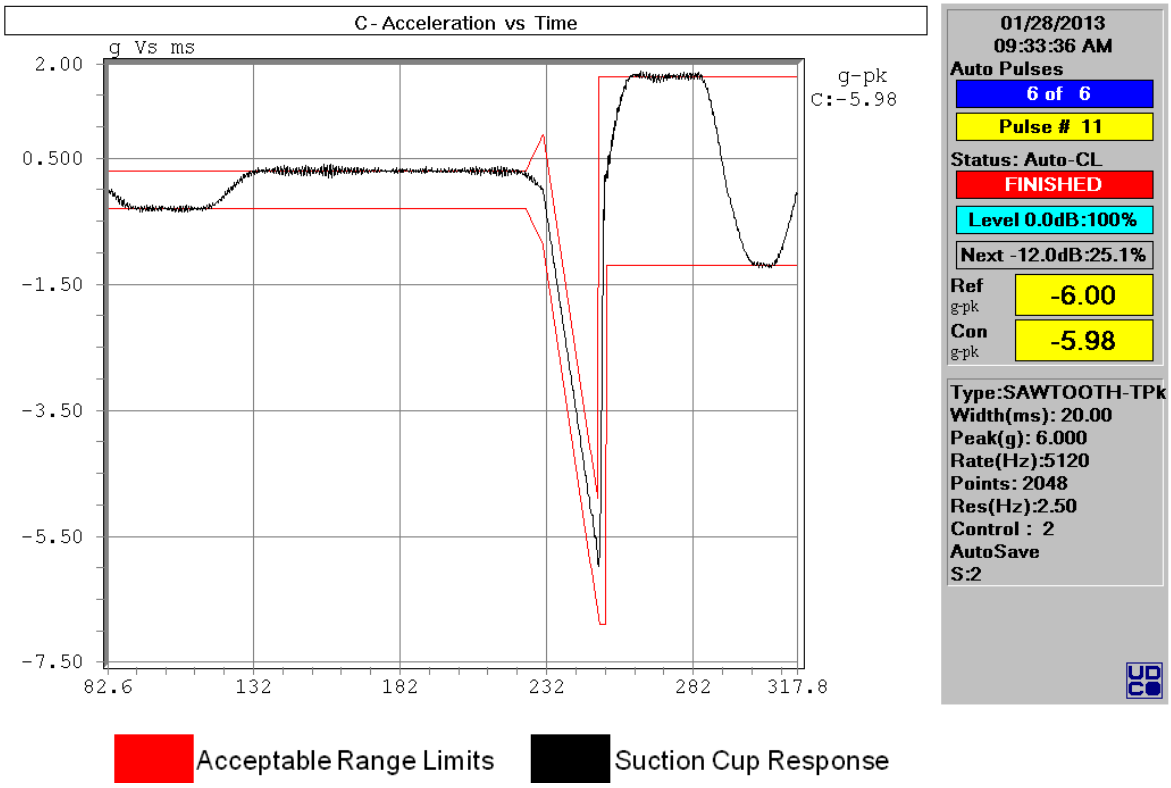
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
(Lobster) Suction Cup D
Op Shock 6 G's 20 ms
RUN NAME: run19
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

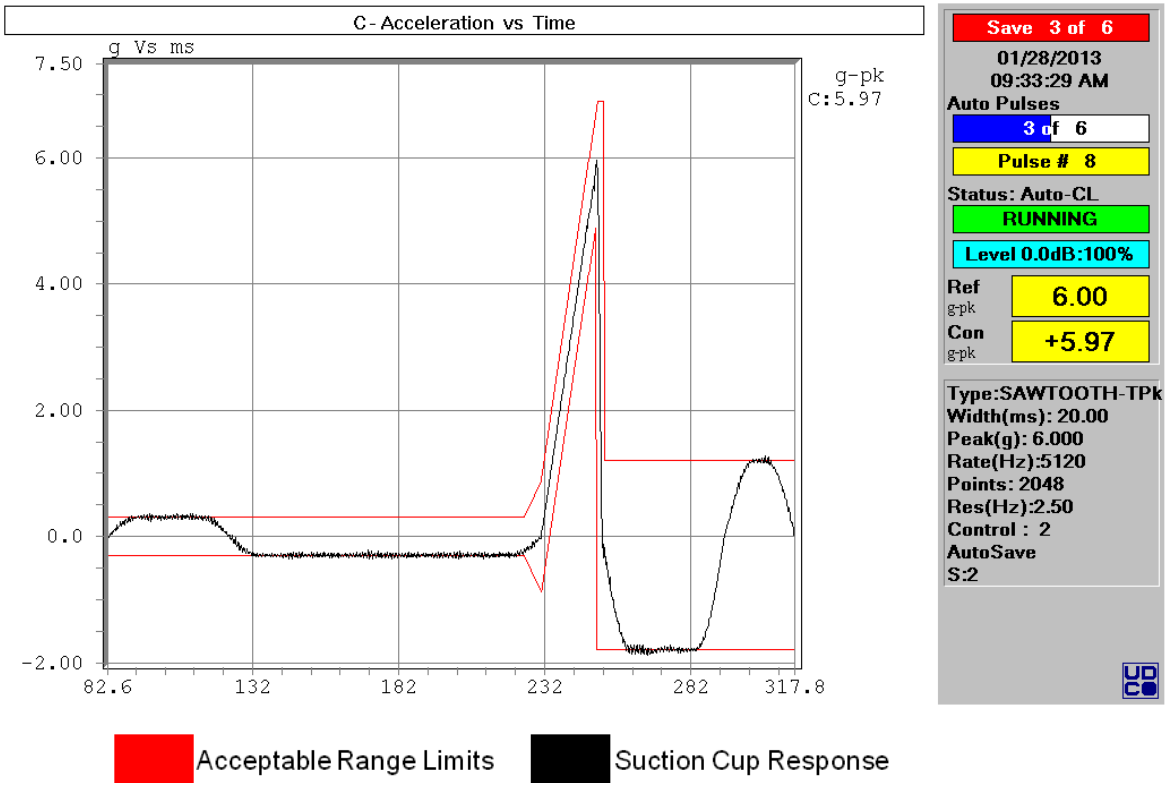
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
(Lobster) Suction Cup D
Op Shock 6 G's 20 ms
RUN NAME: run19
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

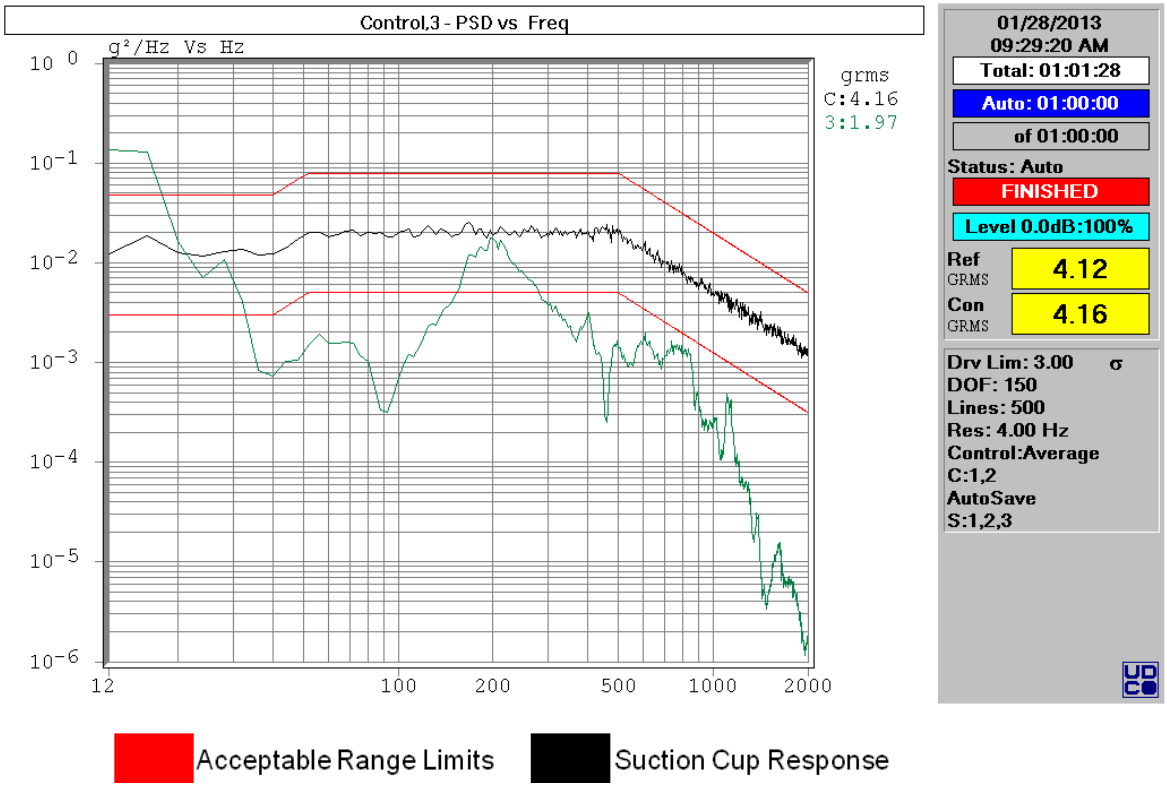
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: (Lobster) Suction Cup D
Phone Installed
Vertical Axis
Random Curve C
RUN NAME: run14
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

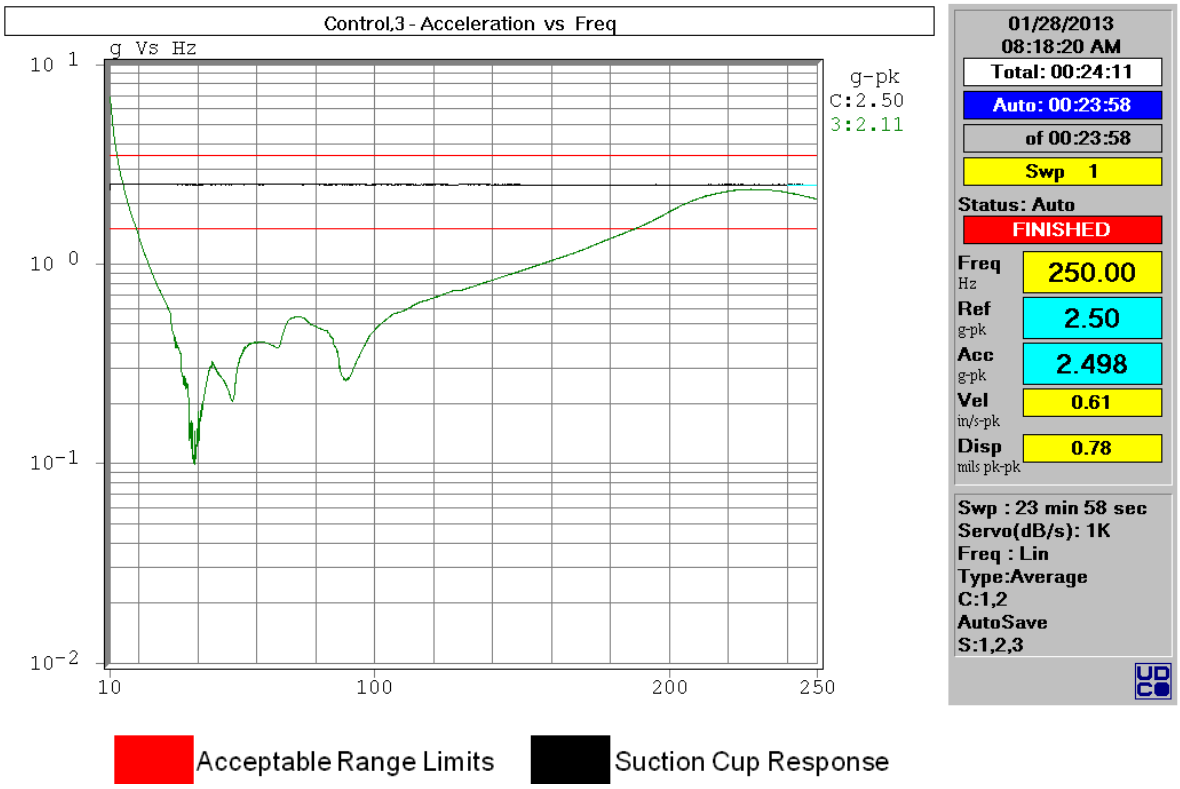
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: (Lobster) Suction Cup D
Phone Installed
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS14
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

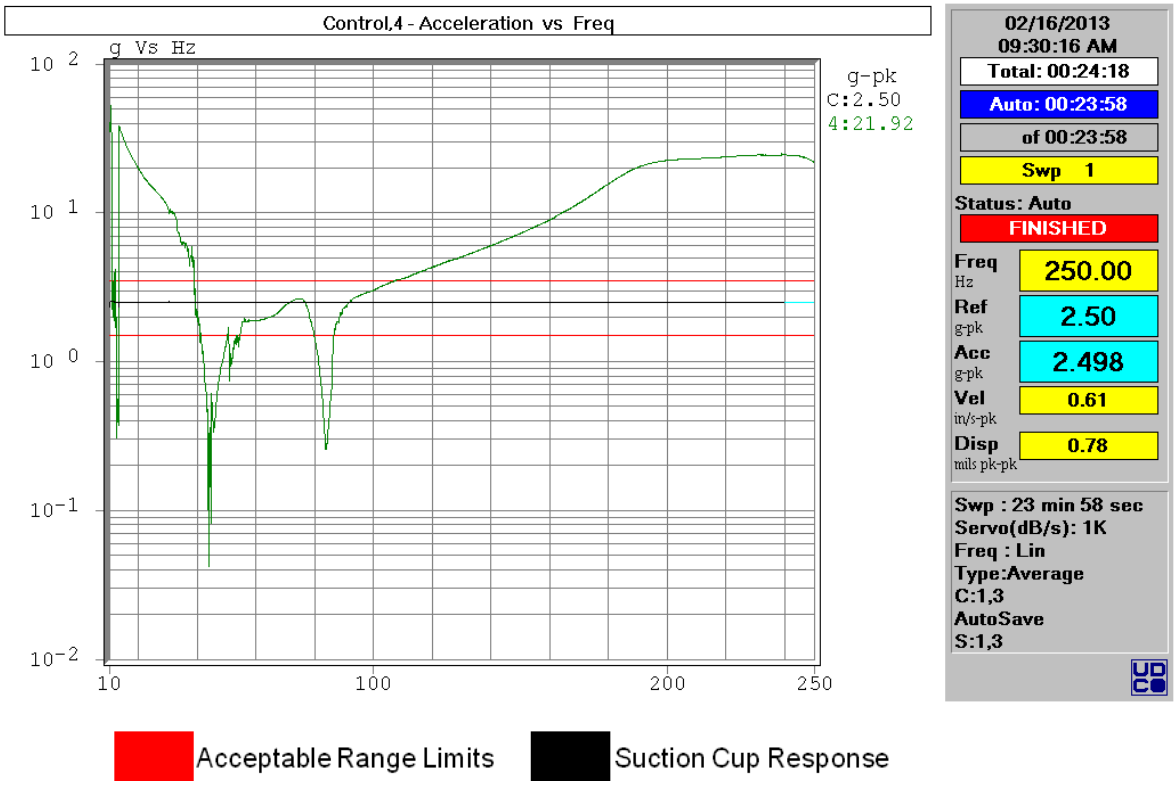
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup D
Phone Installed
Chicken Oil Applied to Windshield Prior to Run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS47
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup D
Phone Installed
Cleaned windshield with cleaner prior to run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS29
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

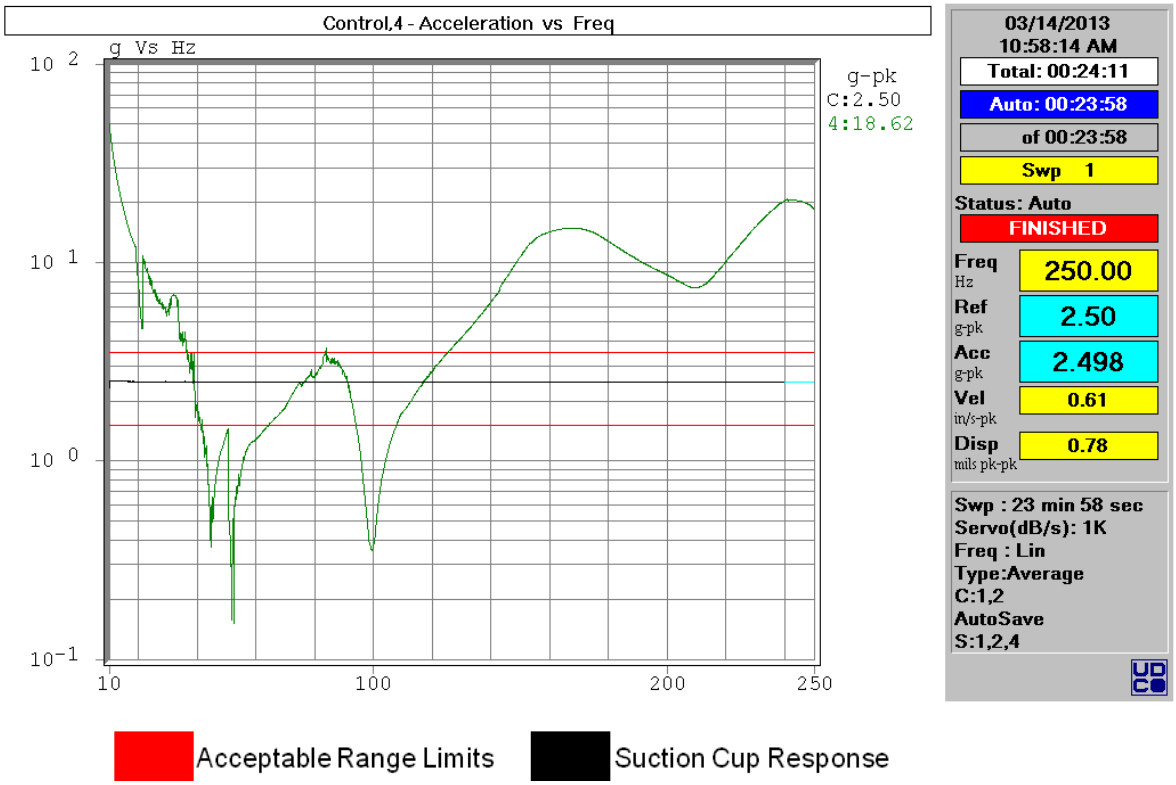
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Painted Surface

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup D
Phone Installed
Painted Surface
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS52
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Dust on Windscreen

Suction Cup D fell off of the plastic windshield before vibration could be started (About 10 minutes after attachment).

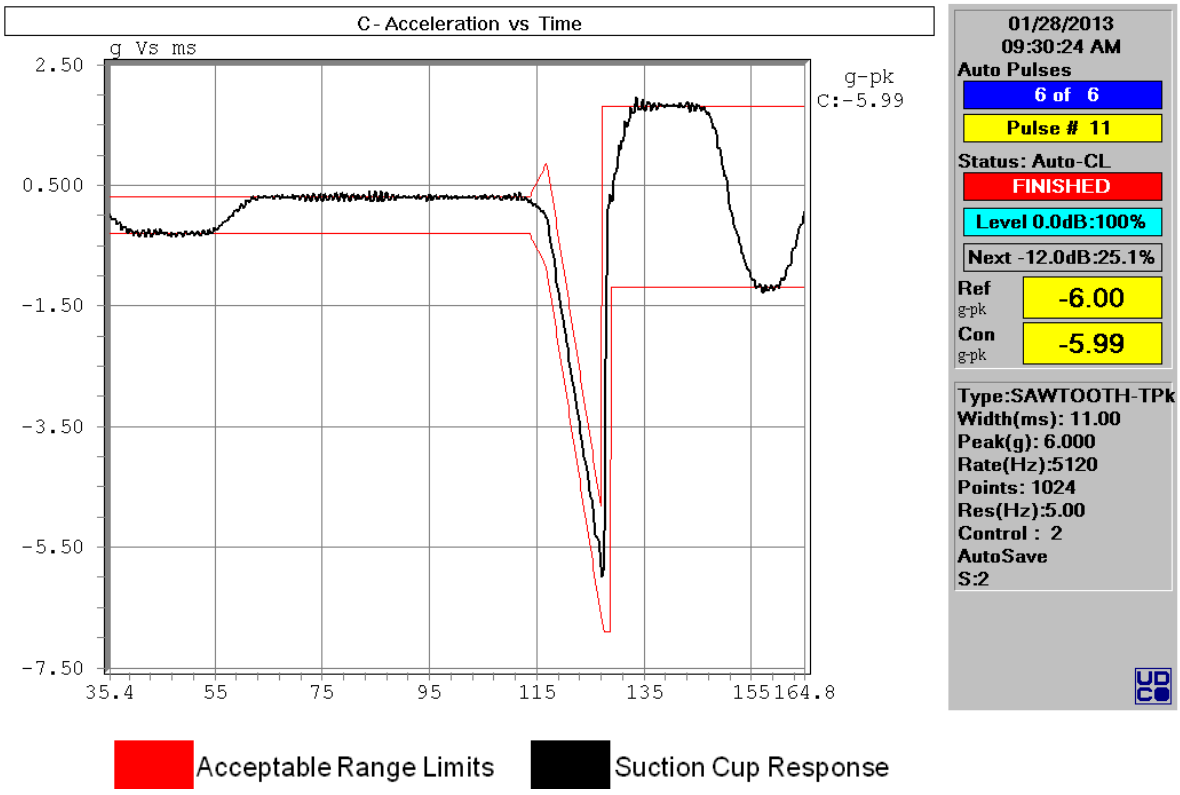
Suction Cup E

Suction Cup E – Front to Back Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: (Lobster) Suction Cup E
Op Shock 6 G's 11 ms
Vertical Axis
RUN NAME: run19
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

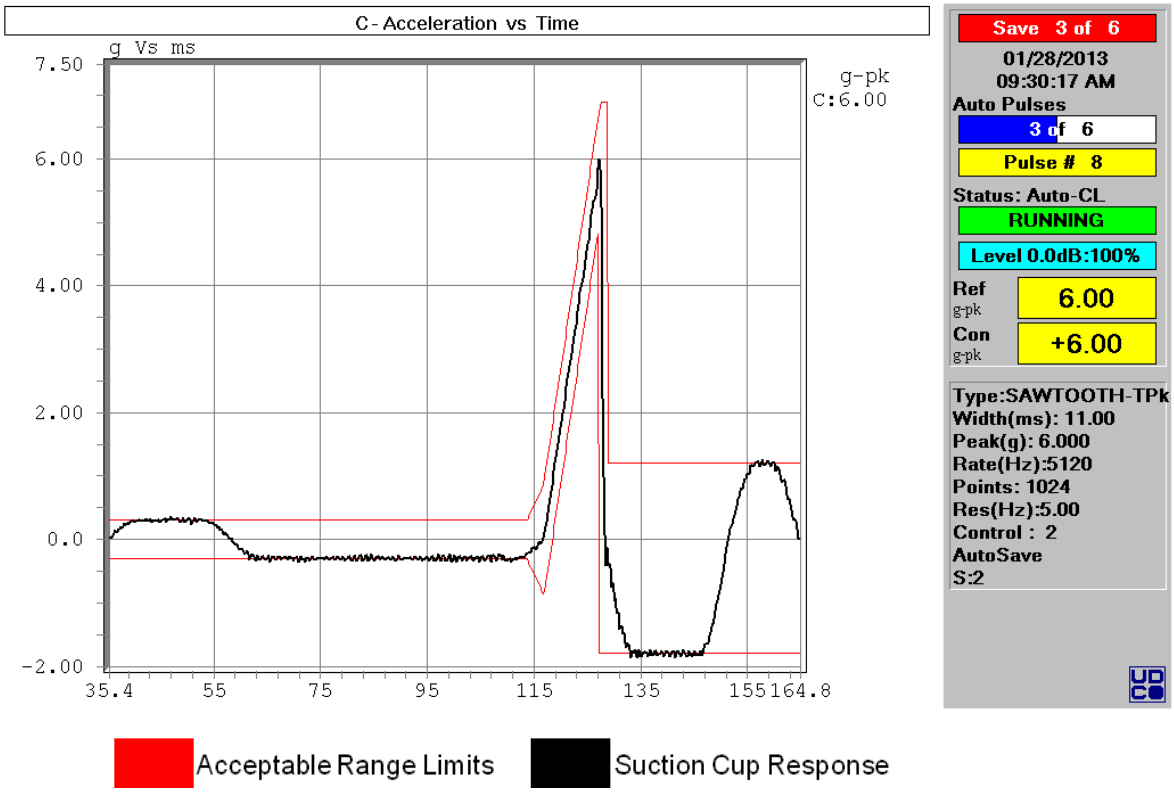
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: (Lobster) Suction Cup E
Op Shock 6 G's 11 ms
Vertical Axis
RUN NAME: run19
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

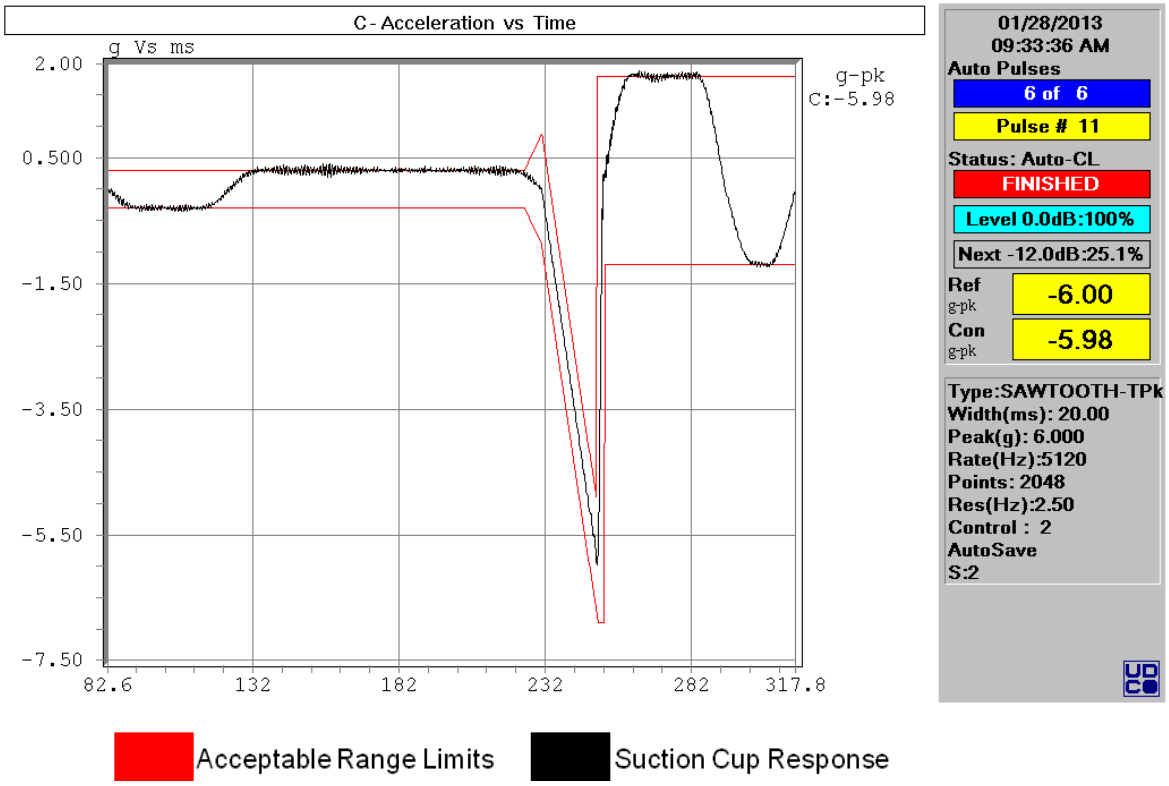
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
(Lobster) Suction Cup E
Op Shock 6 G's 20 ms
RUN NAME: run19
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

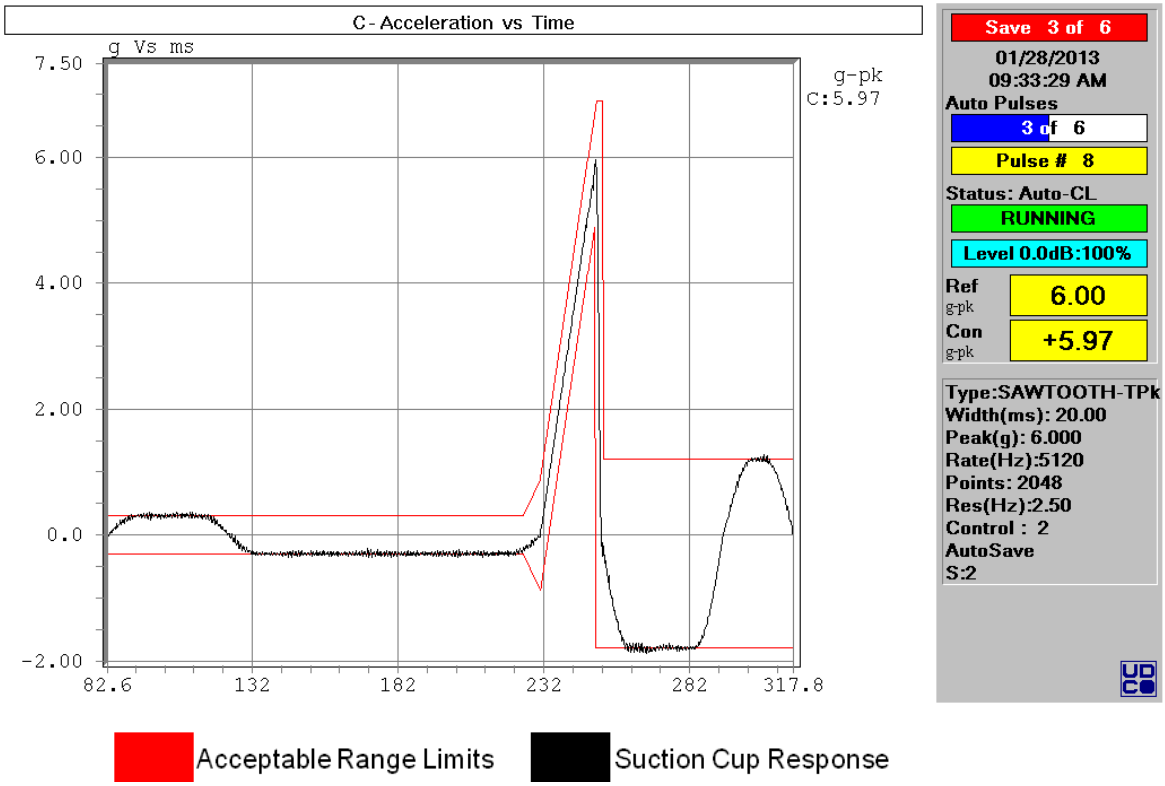
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
(Lobster) Suction Cup E
Op Shock 6 G's 20 ms
RUN NAME: run19
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

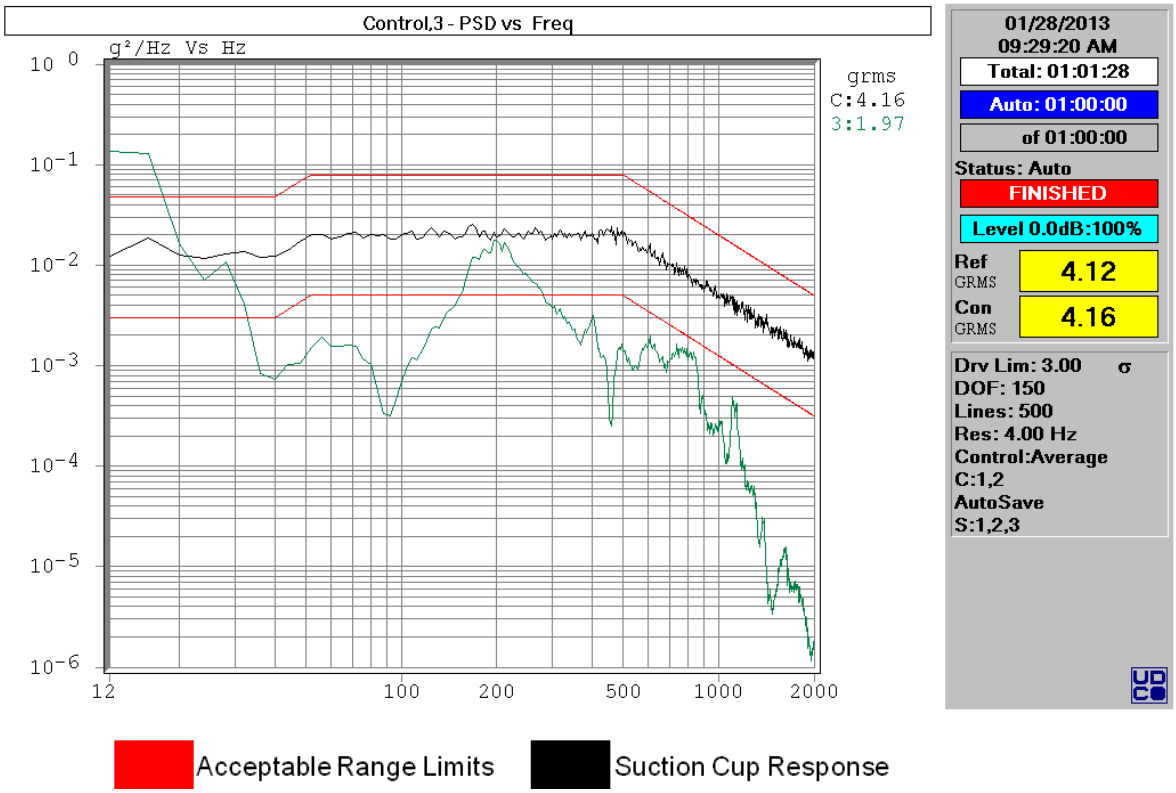
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: (Lobster) Suction Cup E
Phone Installed
Vertical Axis
Random Curve C
RUN NAME: run14
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

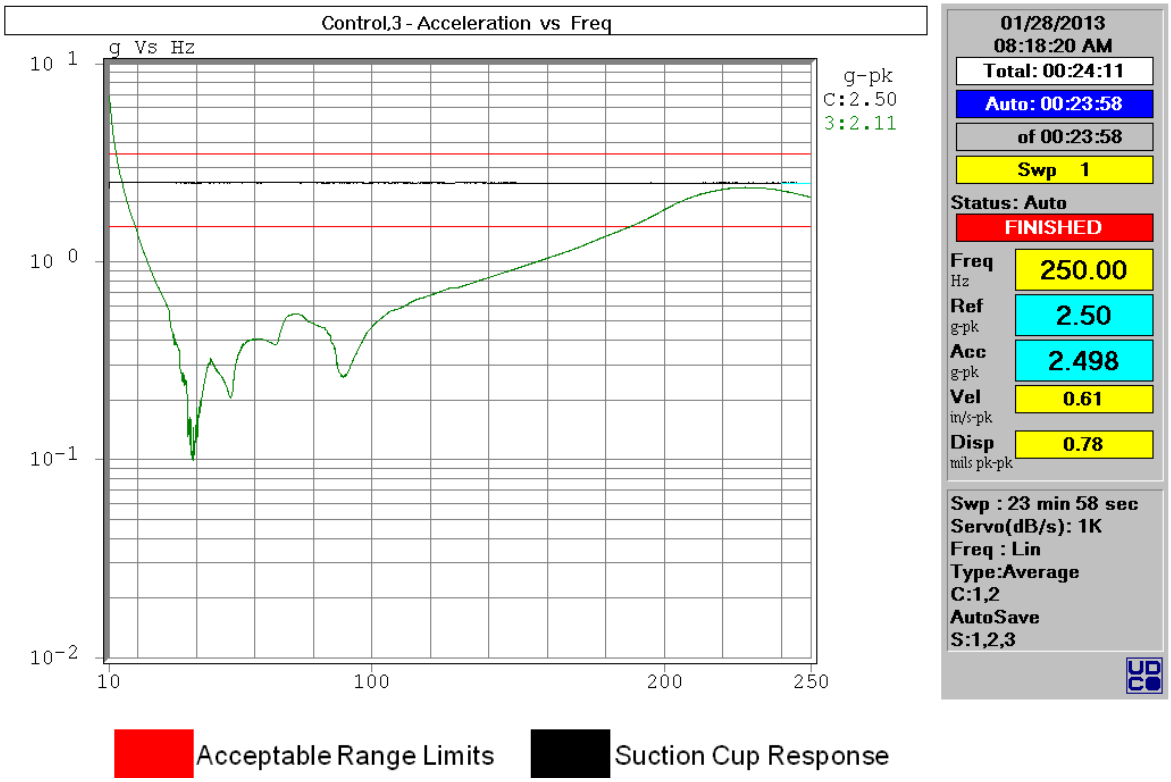
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: (Lobster) Suction Cup D
Phone Installed
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS14
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

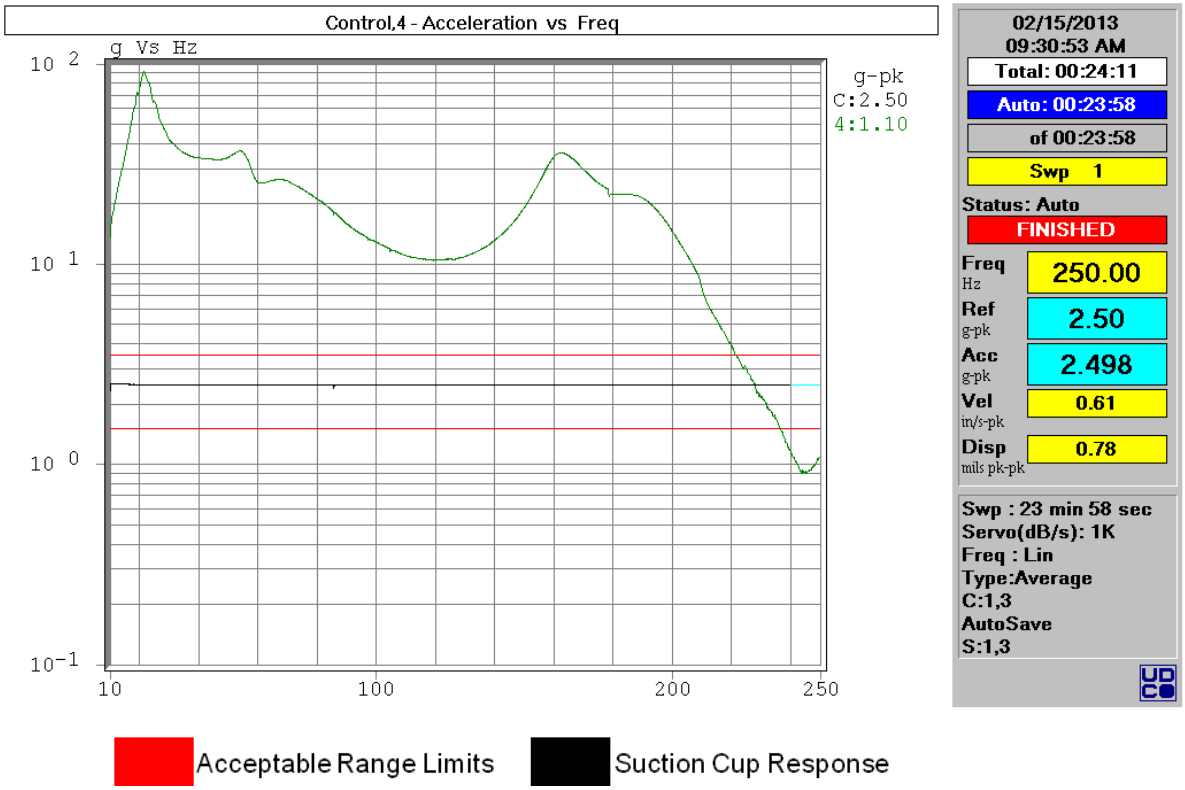
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS38
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
Ipad Installed
Cleaned windshield with cleaner prior to run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS29
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

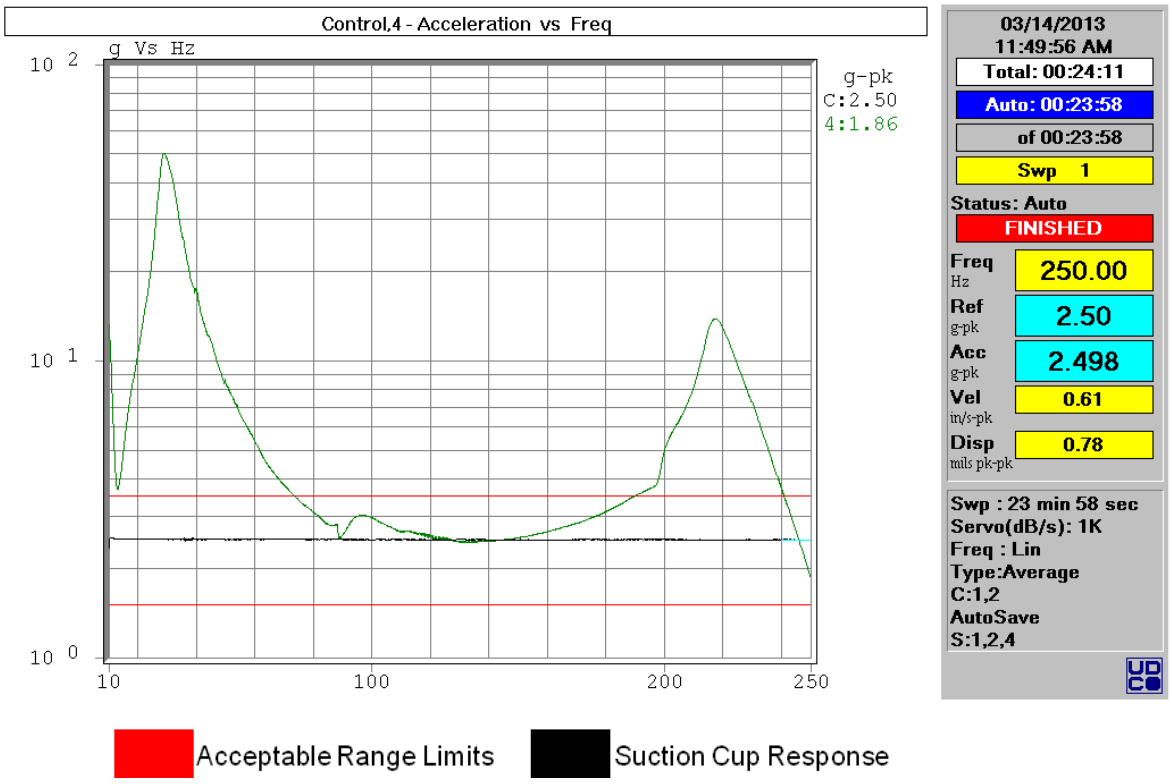
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Painted Surface

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
Ipad Plate Installed
Painted Surface
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS53
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Dust on Windscreen

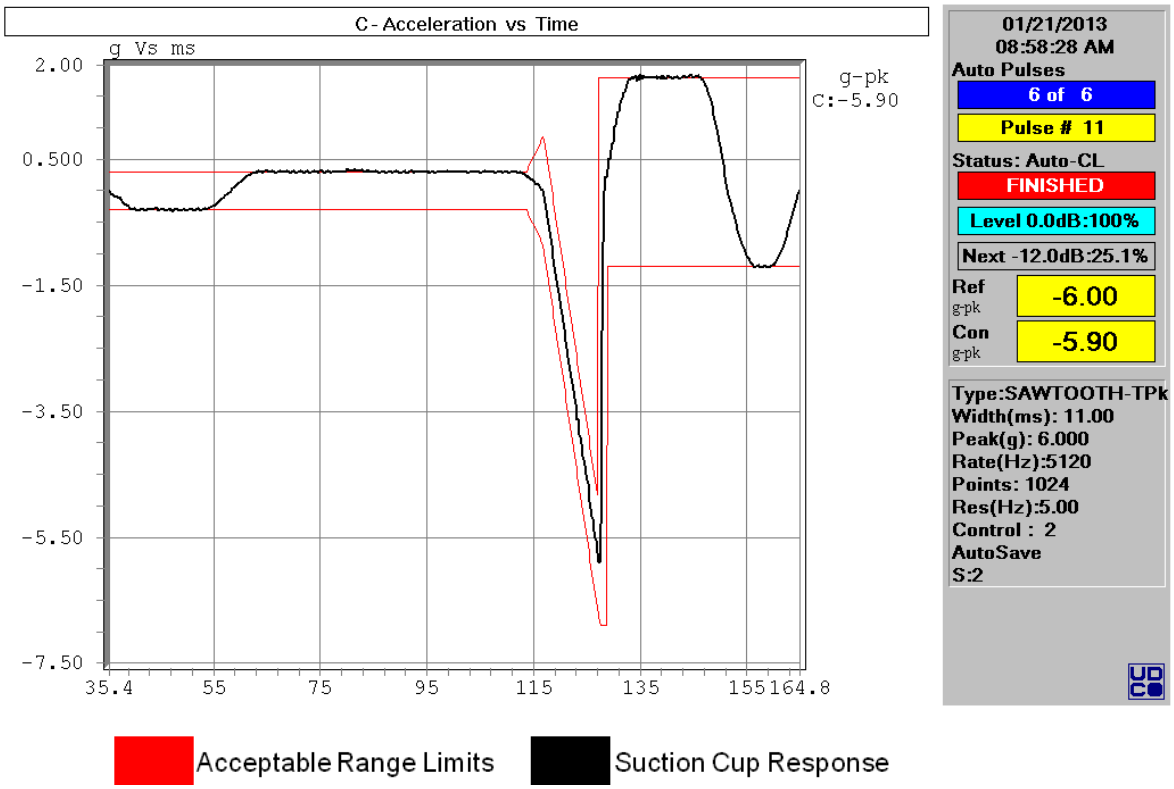
Suction Cup E in axis Front to Back loosened before vibration test could be started (about two minutes after attachment).

Suction Cup E – Side to Side Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup E
Op Shock 6 G's 11 ms
RUN NAME: run10
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

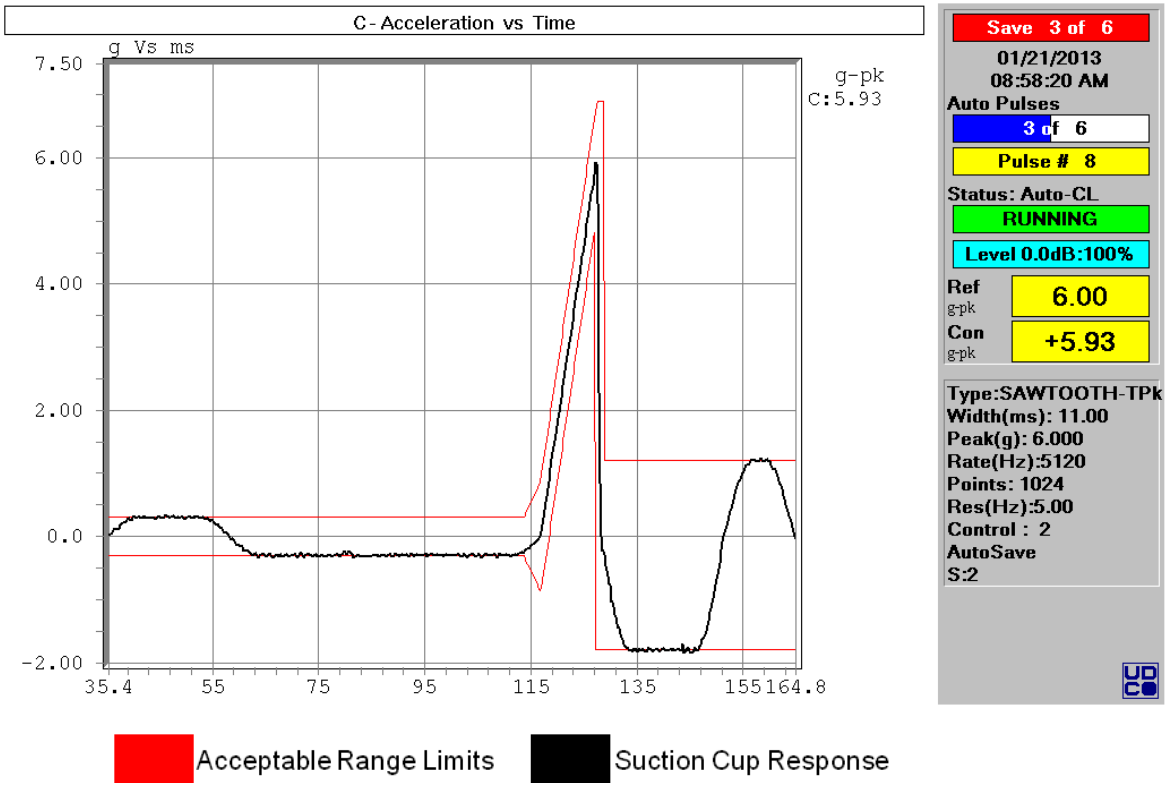
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup E
Op Shock 6 G's 11 ms
RUN NAME: run10
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

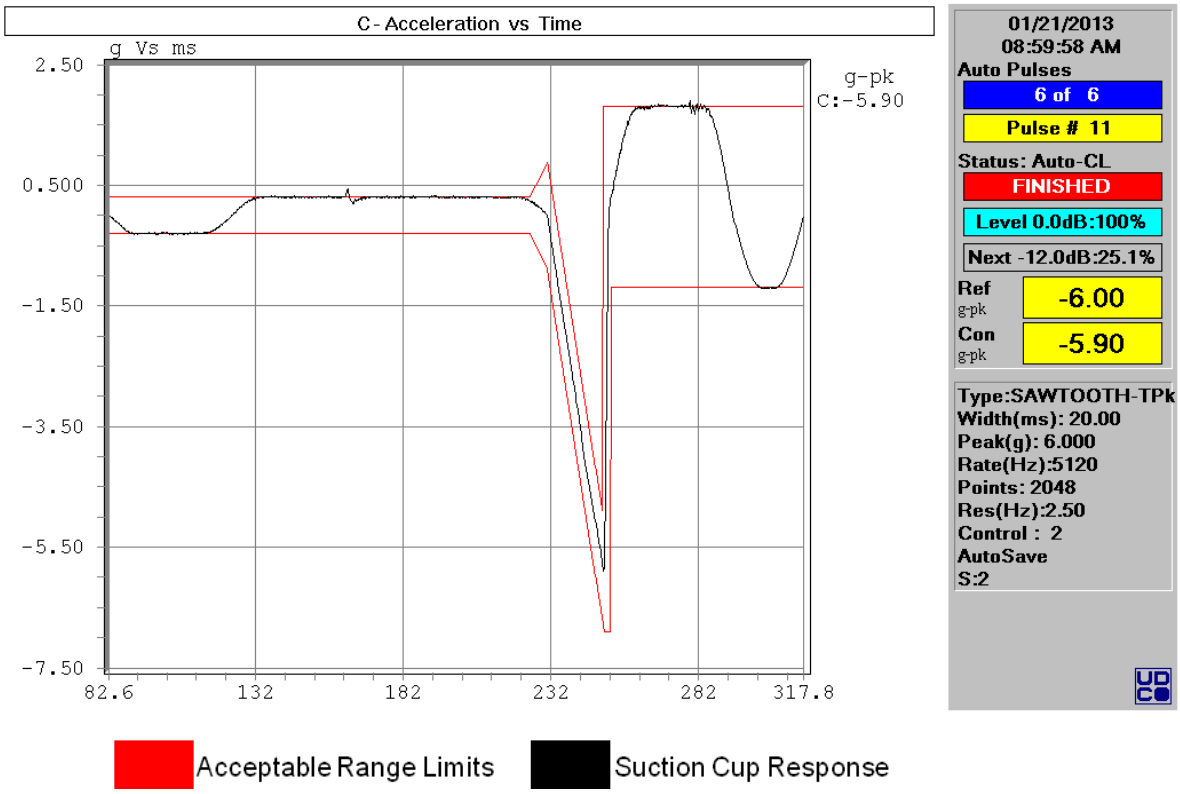
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup E
Op Shock 6 G's 20 ms
RUN NAME: run3
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

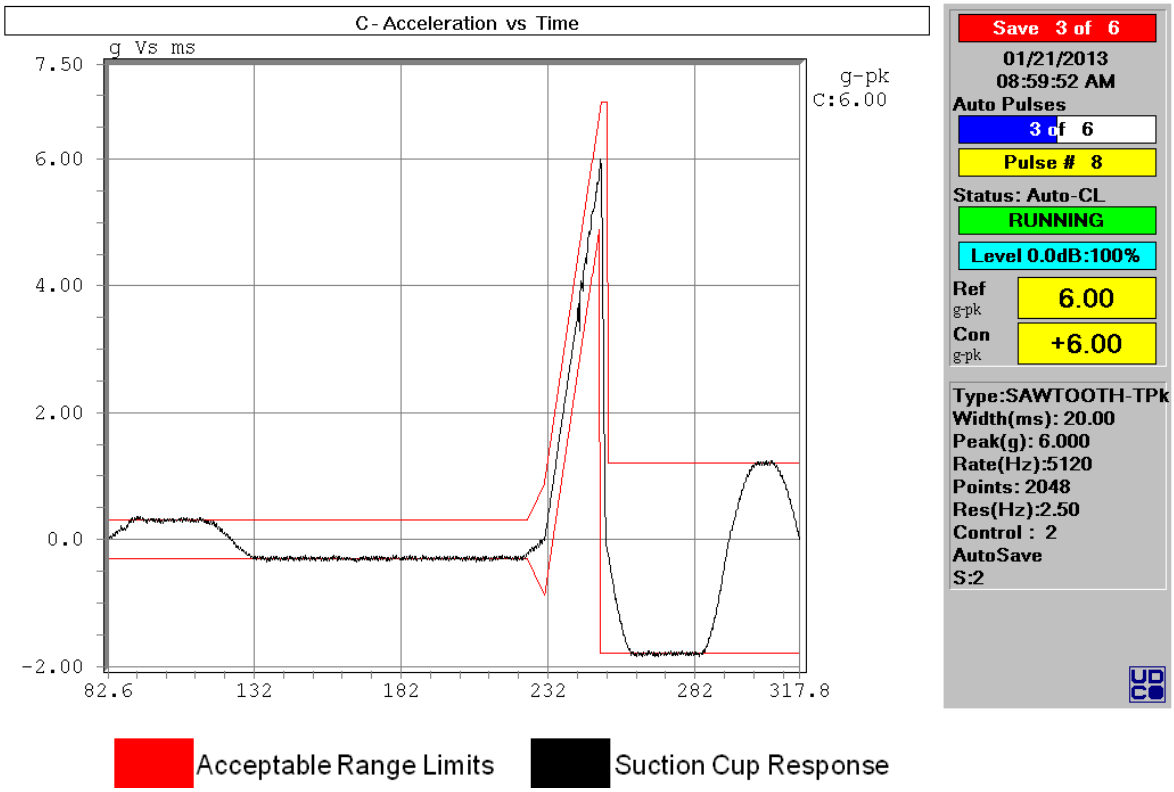
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup E
Op Shock 6 G's 20 ms
RUN NAME: run3
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

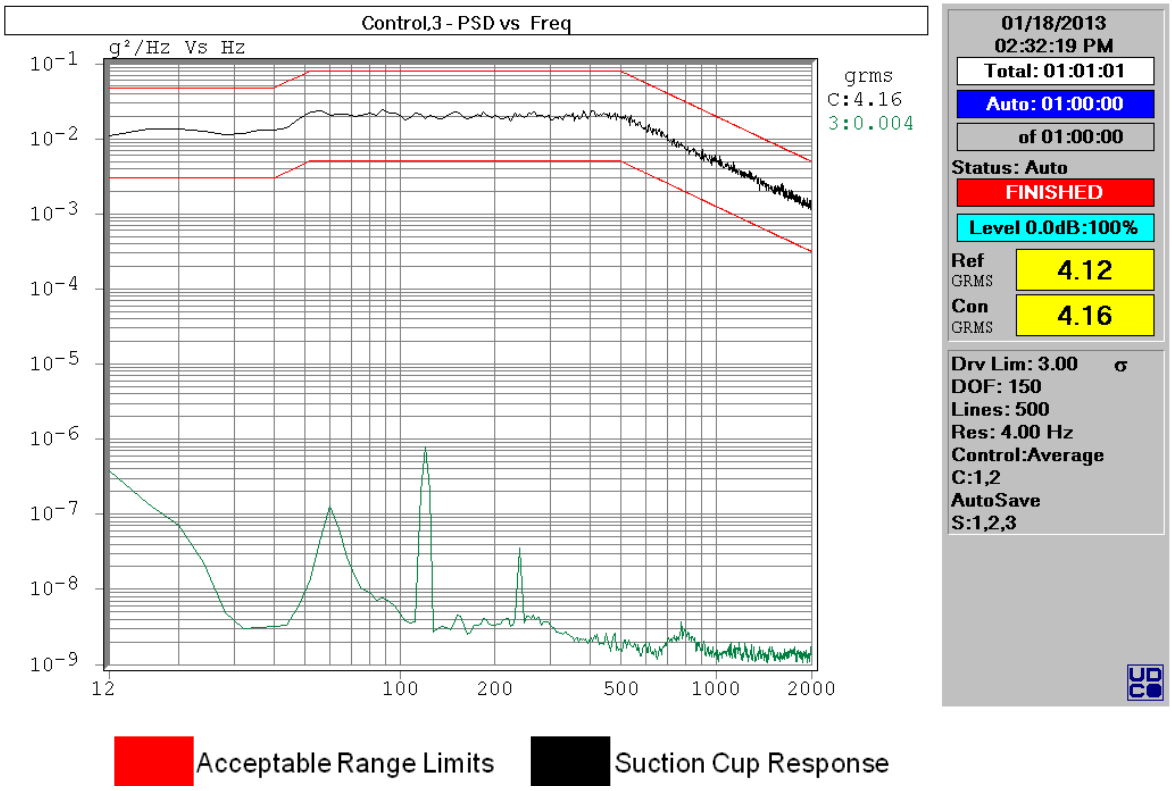
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup E
IPad installed
Side to Side Axis
Random Curve C
RUN NAME: run5
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

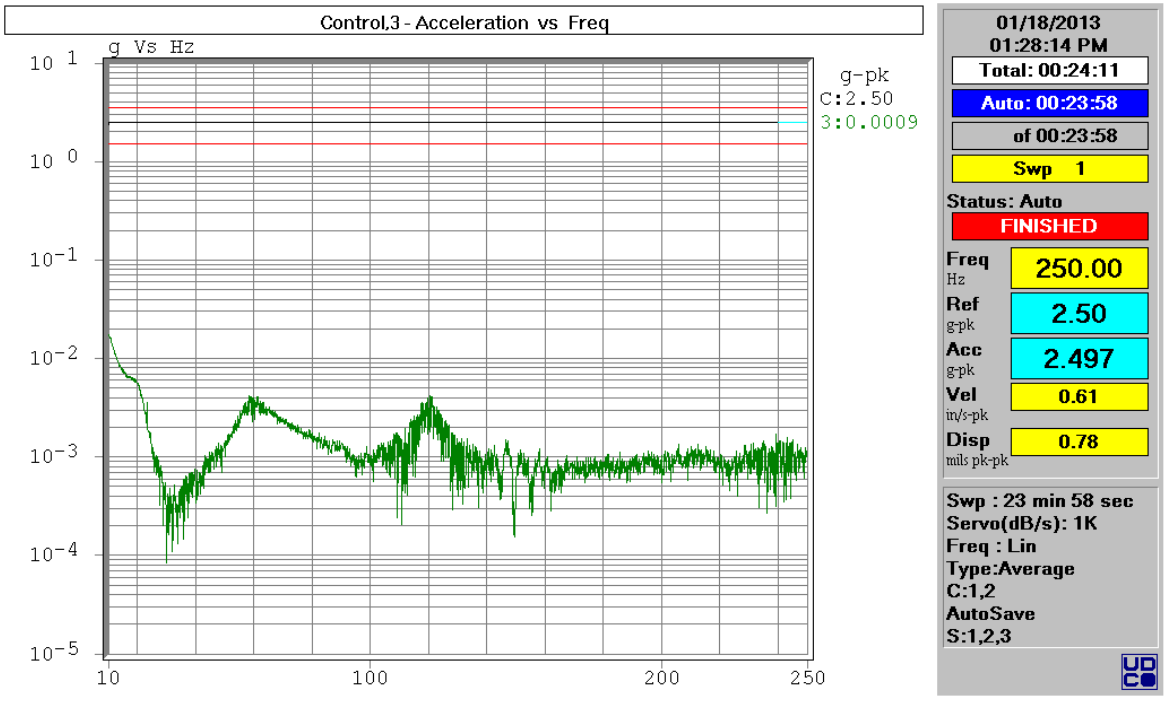
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
IPad Installed
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS5
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

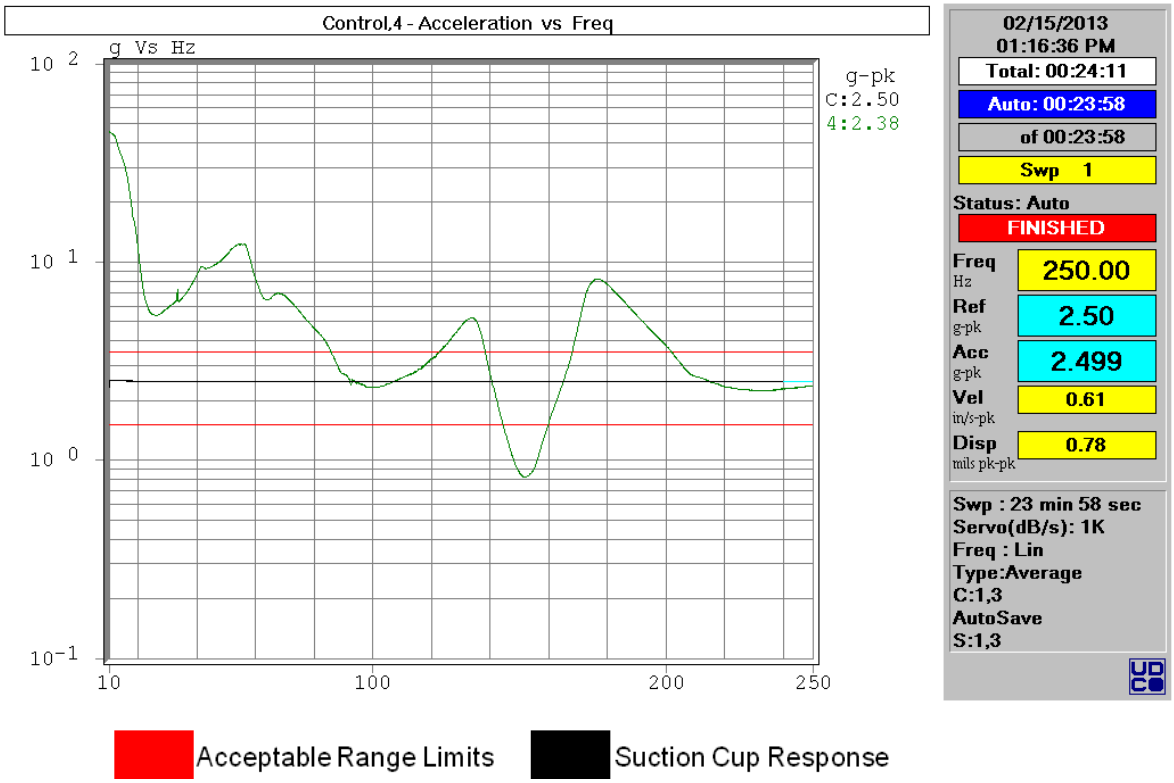
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS43
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

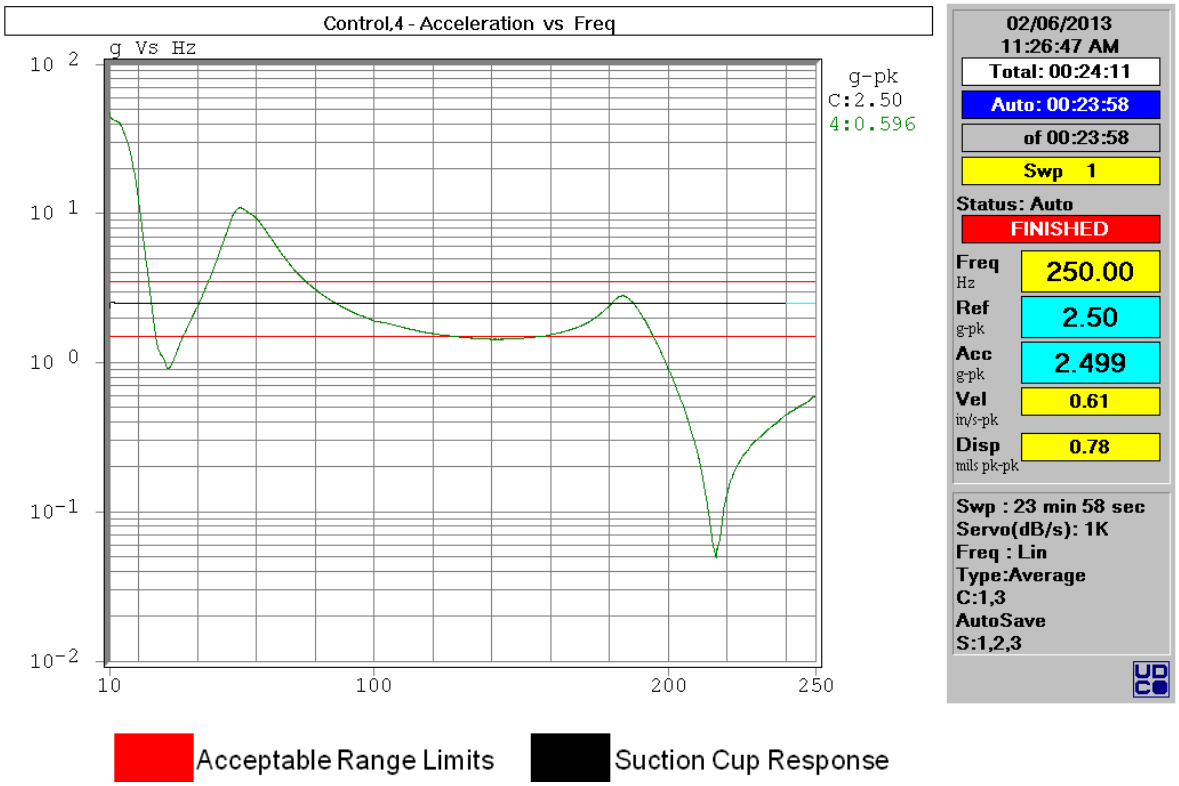
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
Dummy Load for IPad Installed
Cleaned windshield with cleaner prior to run
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS18
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

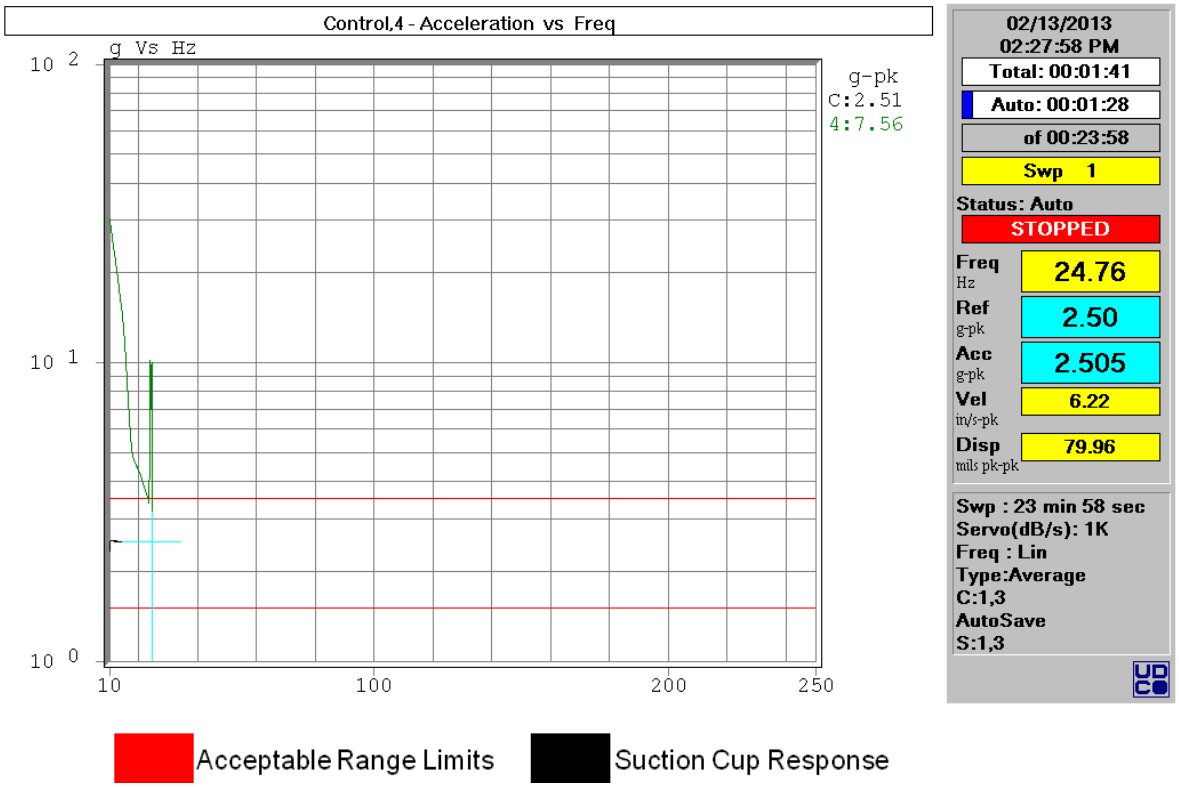
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Dust on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
Ipad Installed
Dusted windshield prior to run
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS35
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1
Suction Cup E fell off after one minute and twenty-eight seconds of vibration.



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

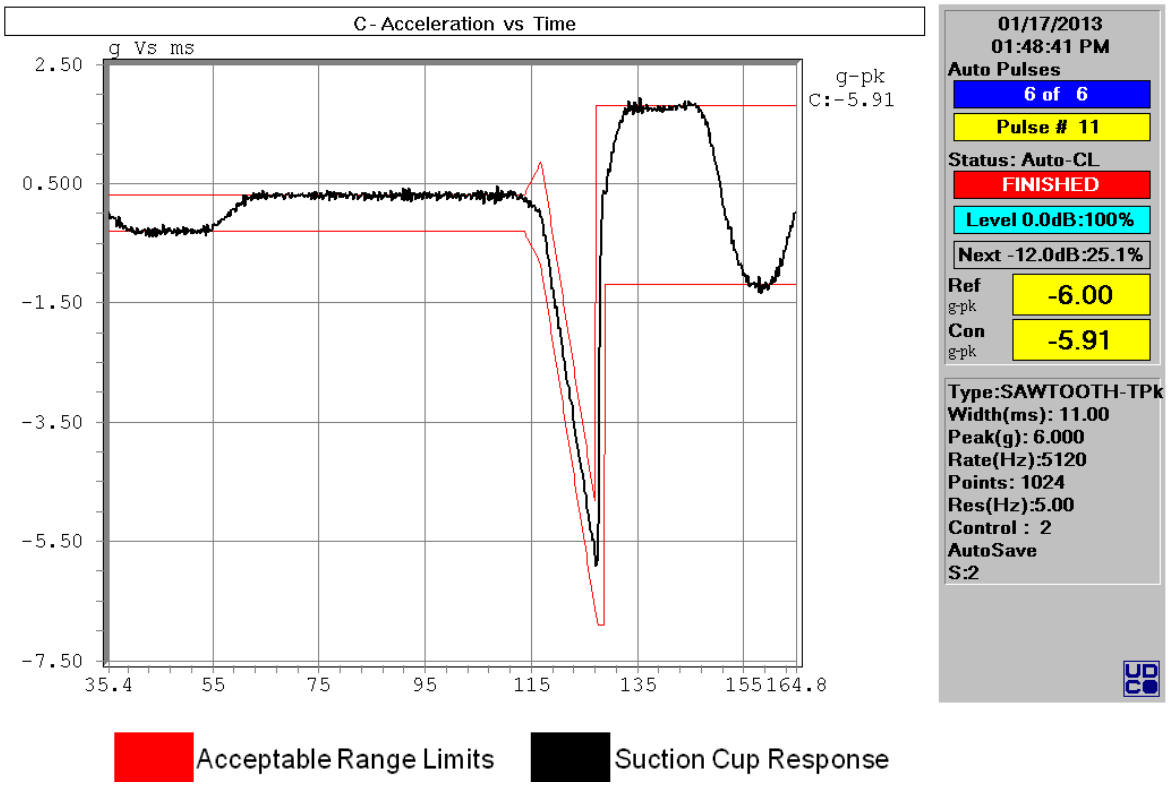
UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup E - Vertical Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup E
Op Shock 6 G's 11 ms
RUN NAME: run8
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

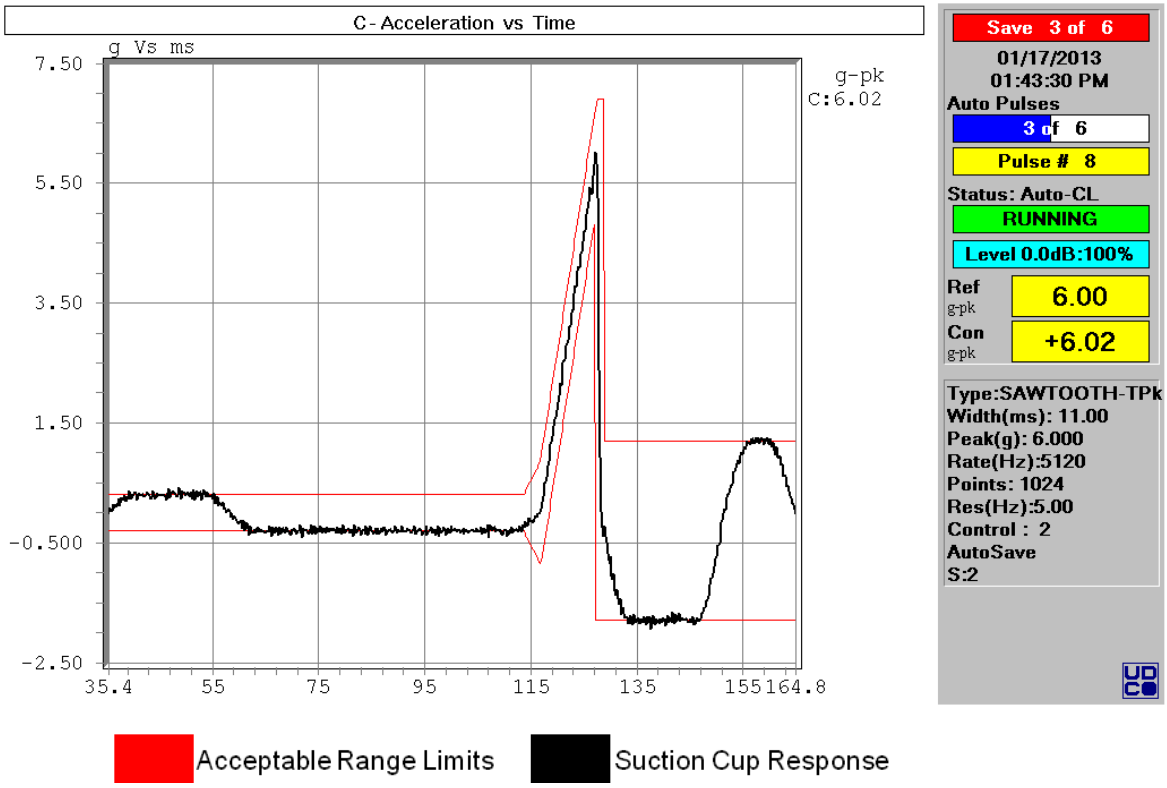
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup E
Op Shock 6 G's 11 ms
RUN NAME: run8
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

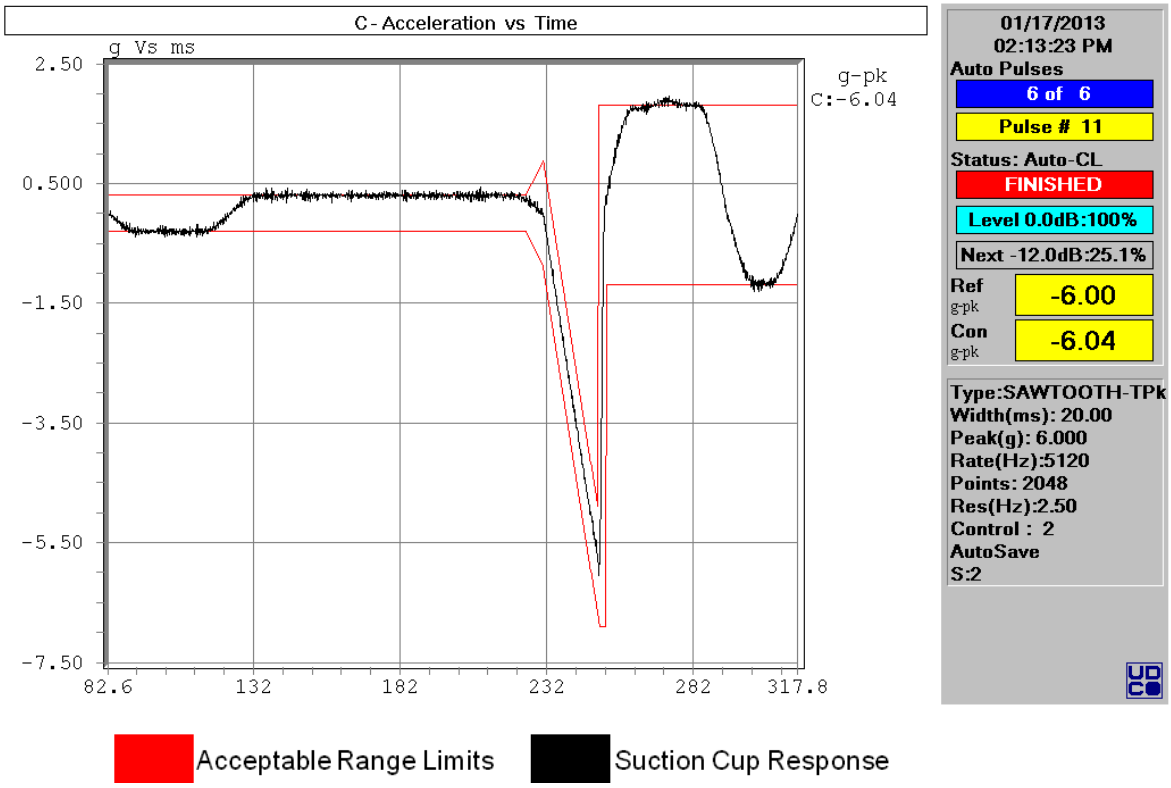
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup E
Op Shock 6 G's 20 ms
RUN NAME: run1
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS
WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

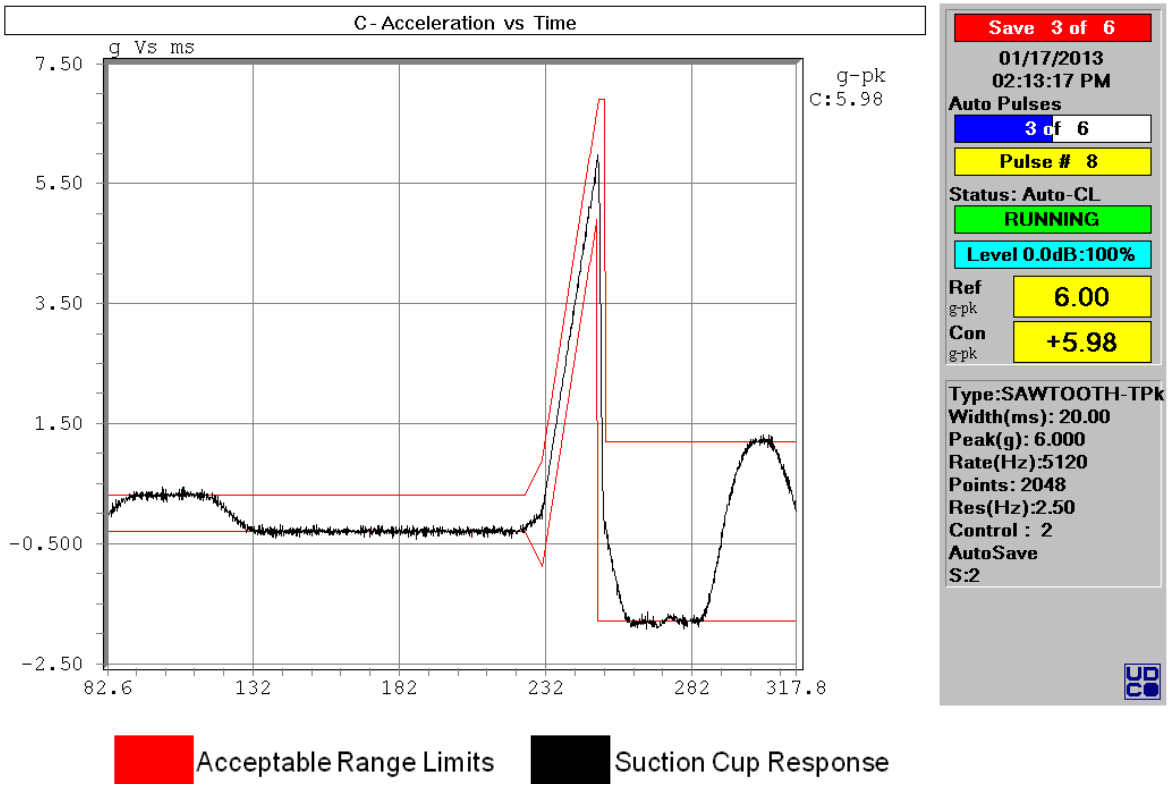
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup E
Op Shock 6 G's 20 ms
RUN NAME: run1
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

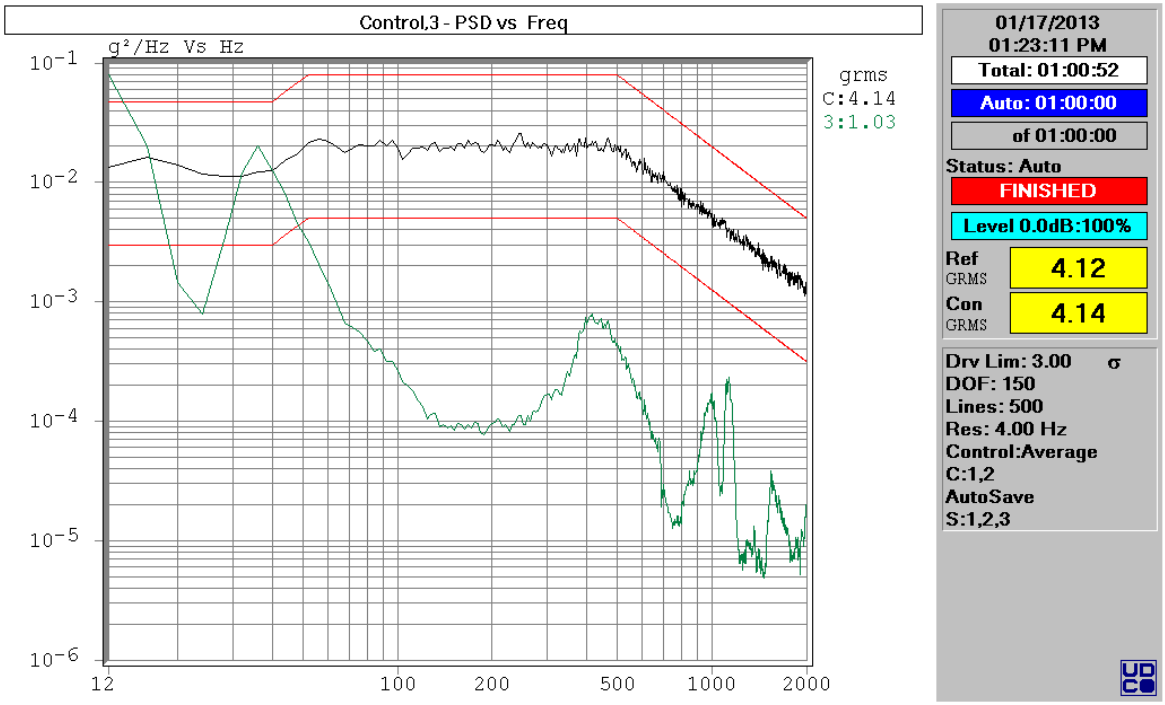
TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C
Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup E
IPad installed
Vertical Axis
Random Curve C
RUN NAME: run3
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

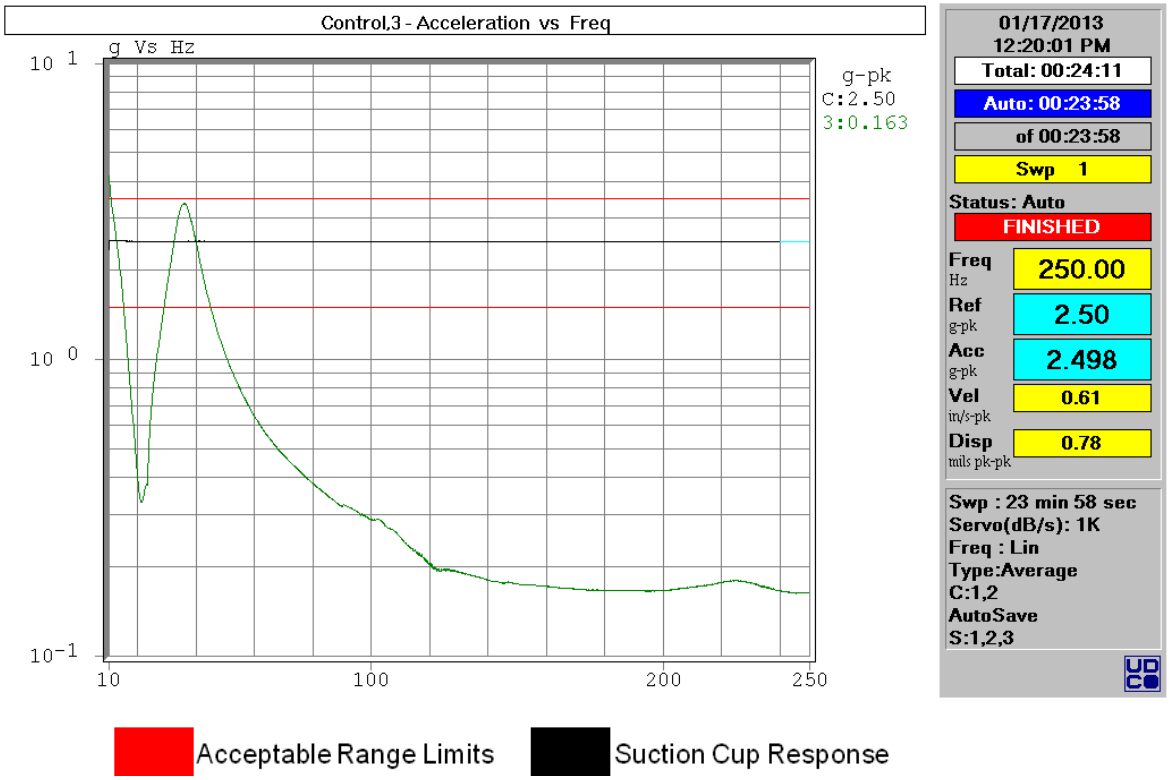
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
IPad Installed
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS3
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS
START LEVEL: -12.00 dB, (25.12% of full level)

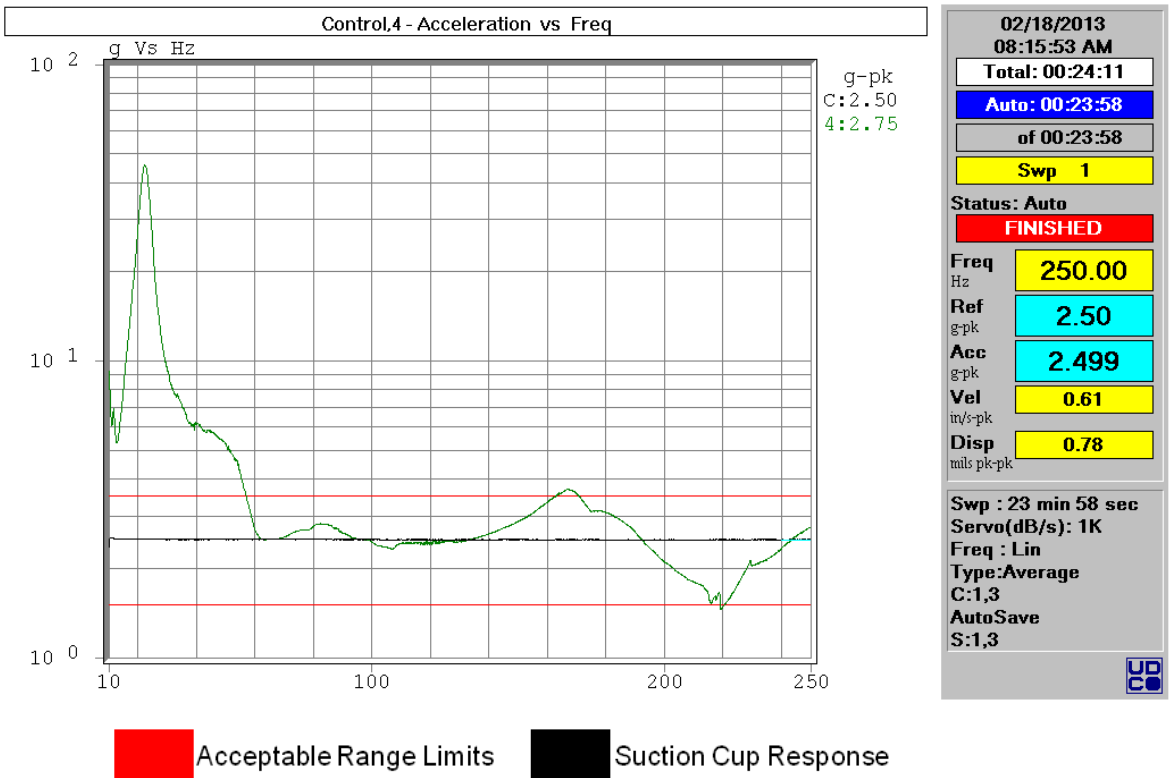
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS48
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

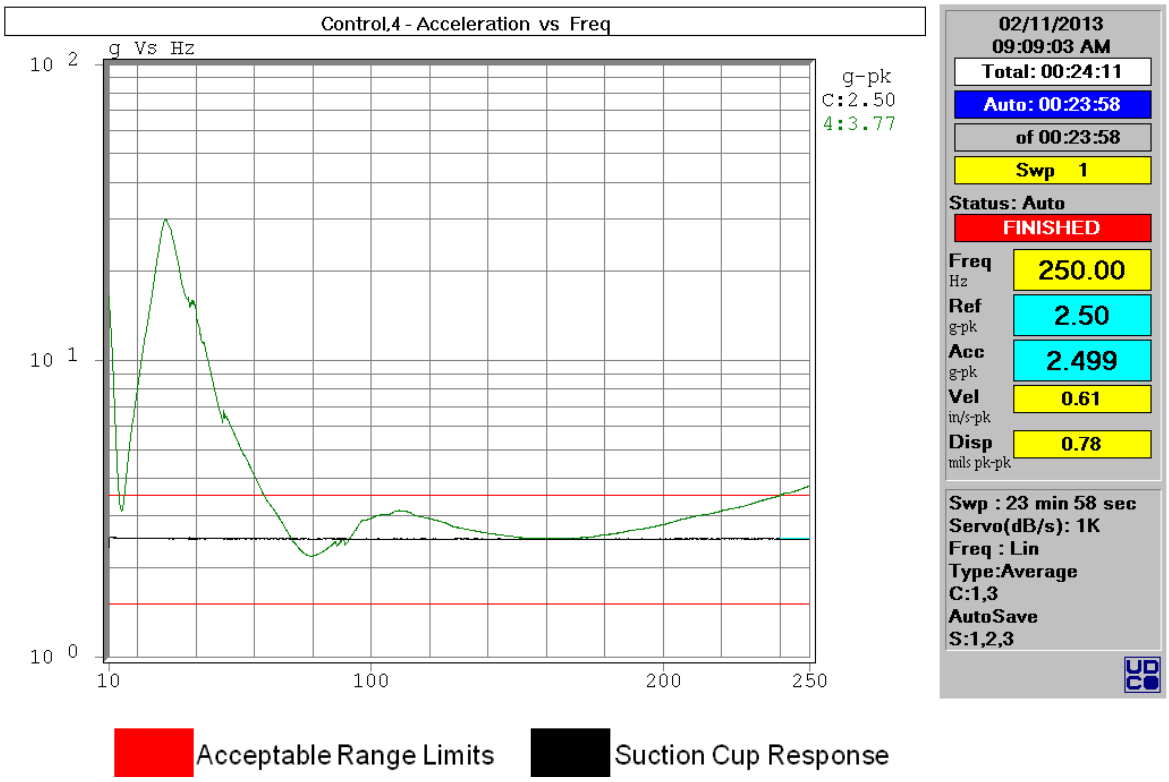
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
Ipad Installed
Cleaned windshield with cleaner prior to run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS30
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

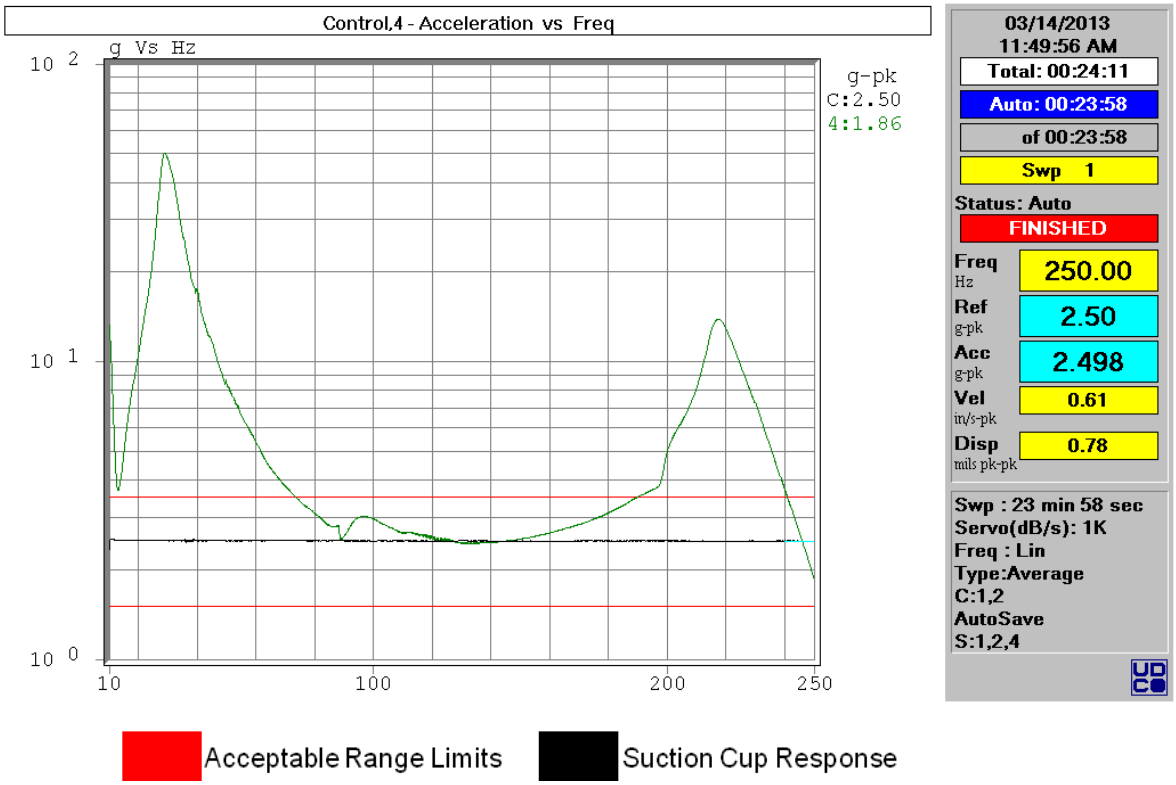
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Painted Surface

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
Ipad Plate Installed
Painted Surface
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS53
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

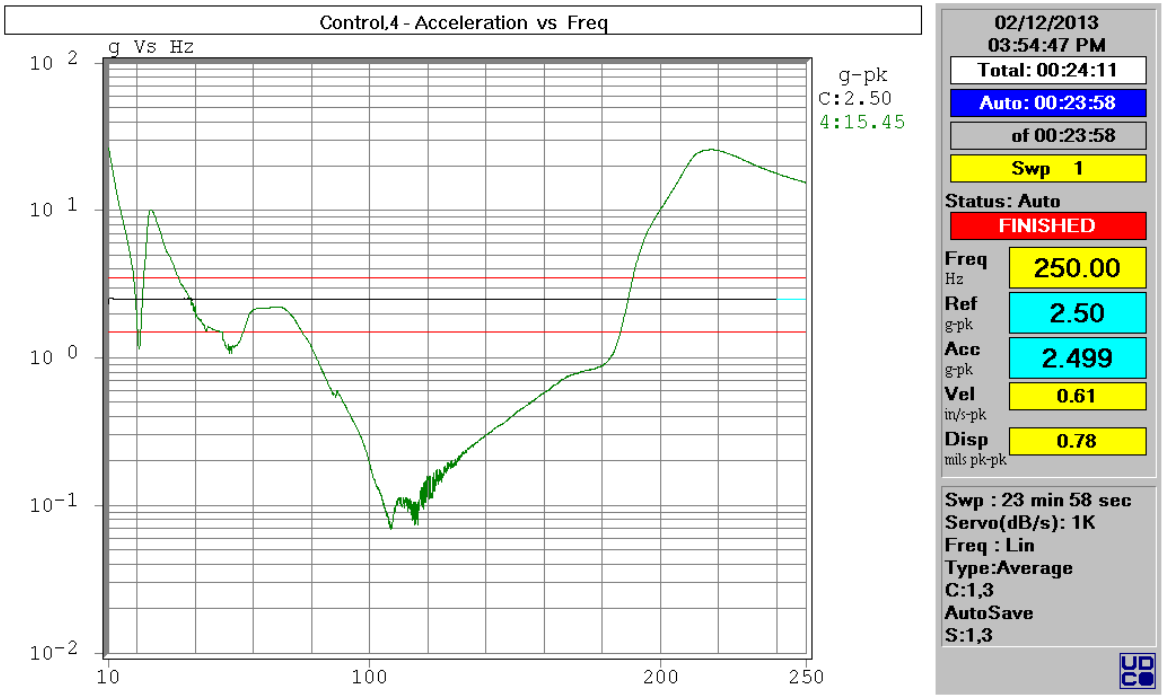
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Dust on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup E
Ipad Installed
Dusted windshield prior to run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS34
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

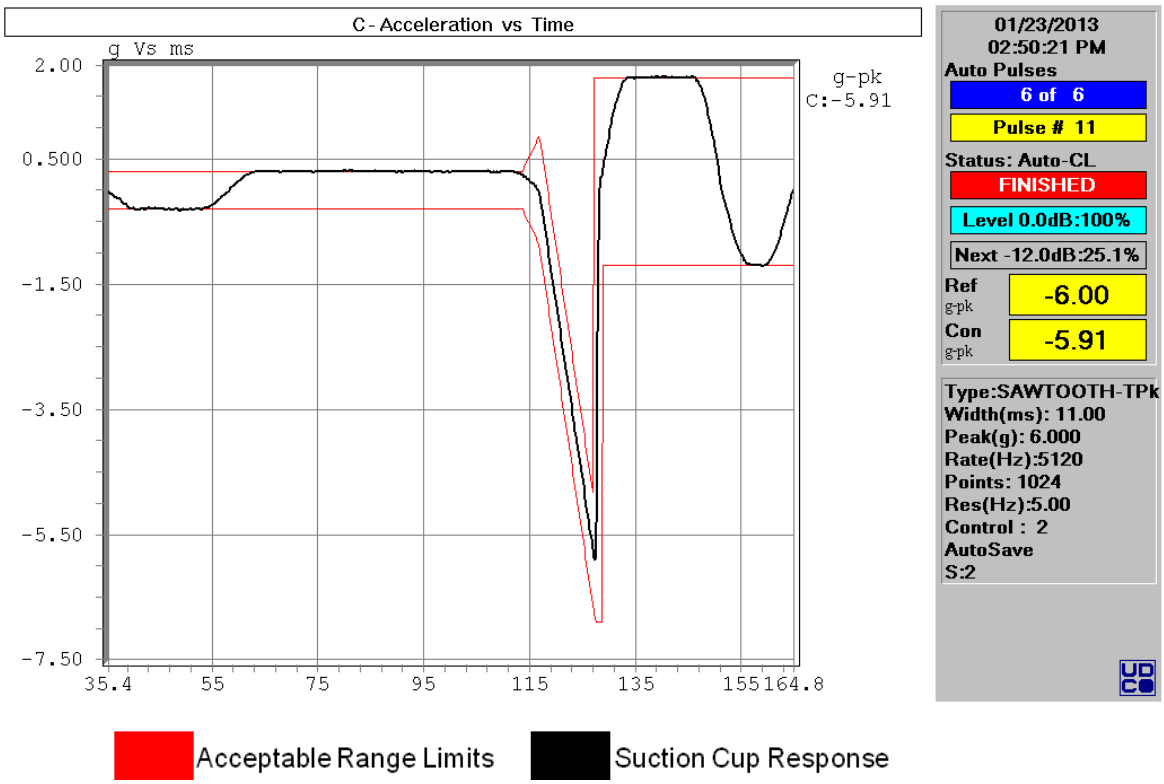
Suction Cup F

Suction Cup F – Front to Back Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup F
Op Shock 6 G's 11 ms
RUN NAME: run16
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

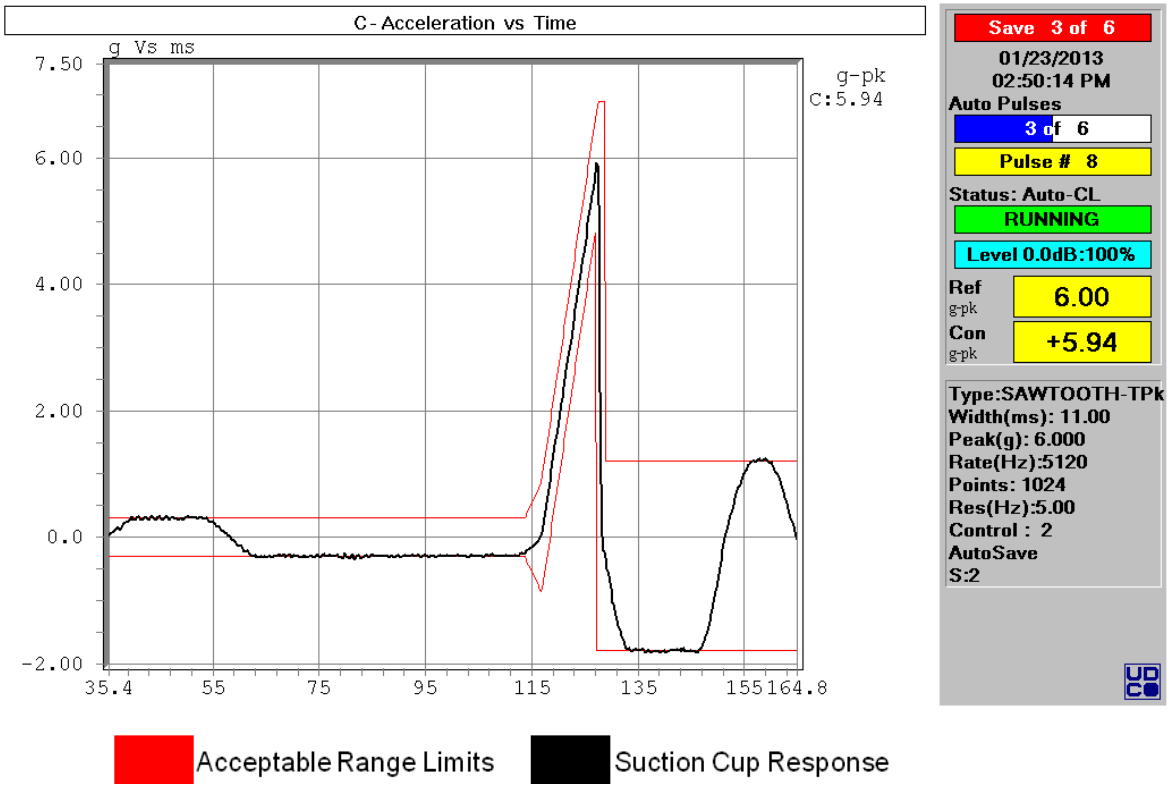
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup F
Op Shock 6 G's 11 ms
RUN NAME: run16
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

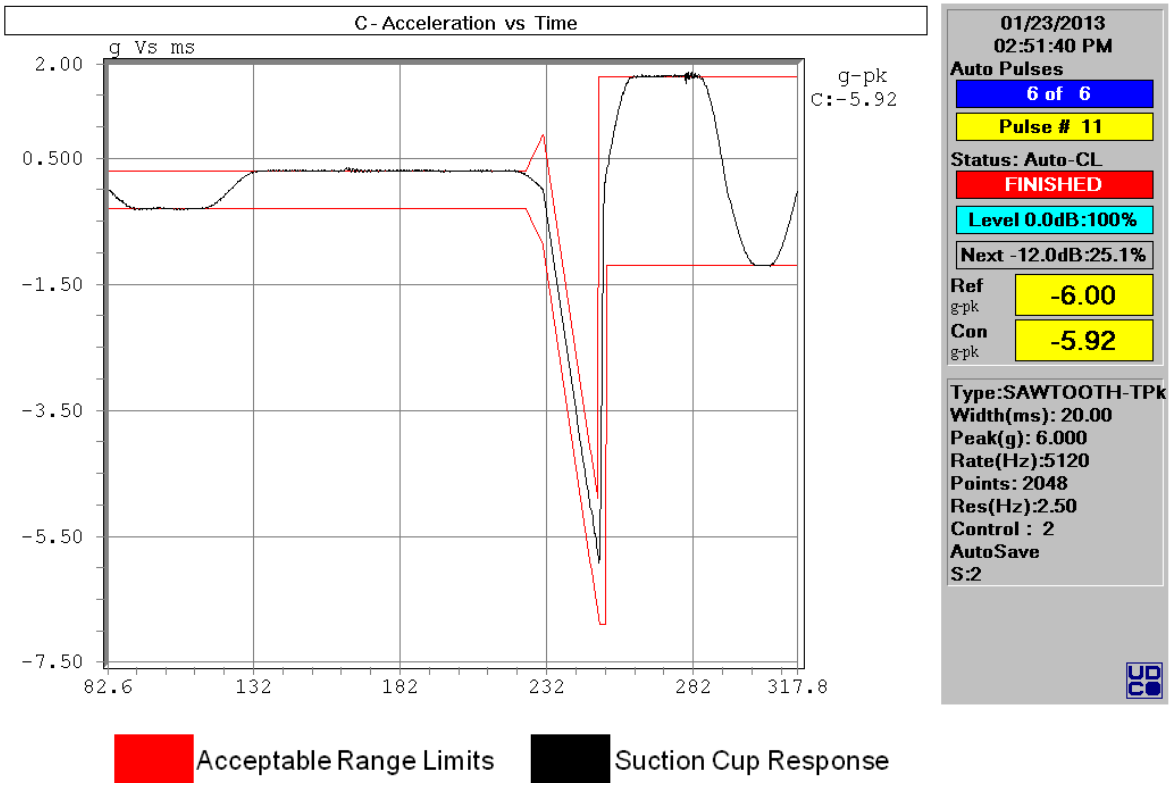
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup F
Op Shock 6 G's 20 ms
RUN NAME: run12
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

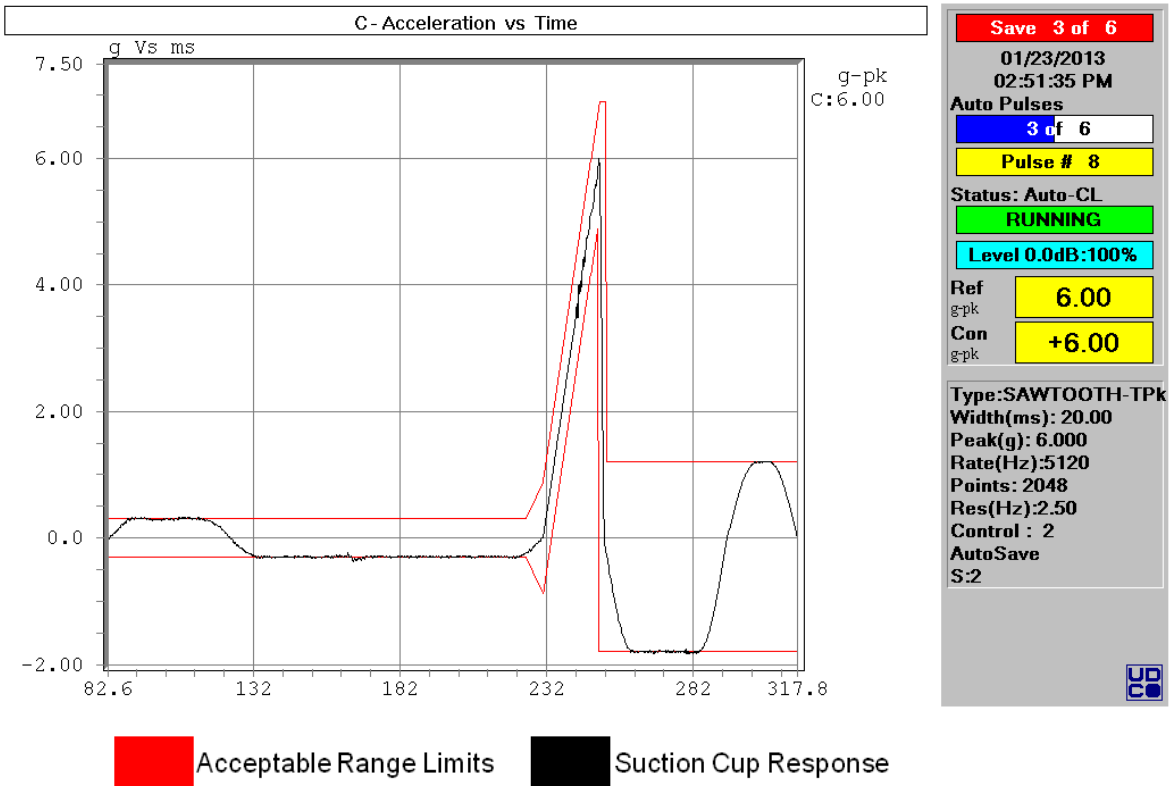
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup F
Op Shock 6 G's 20 ms
RUN NAME: run12
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

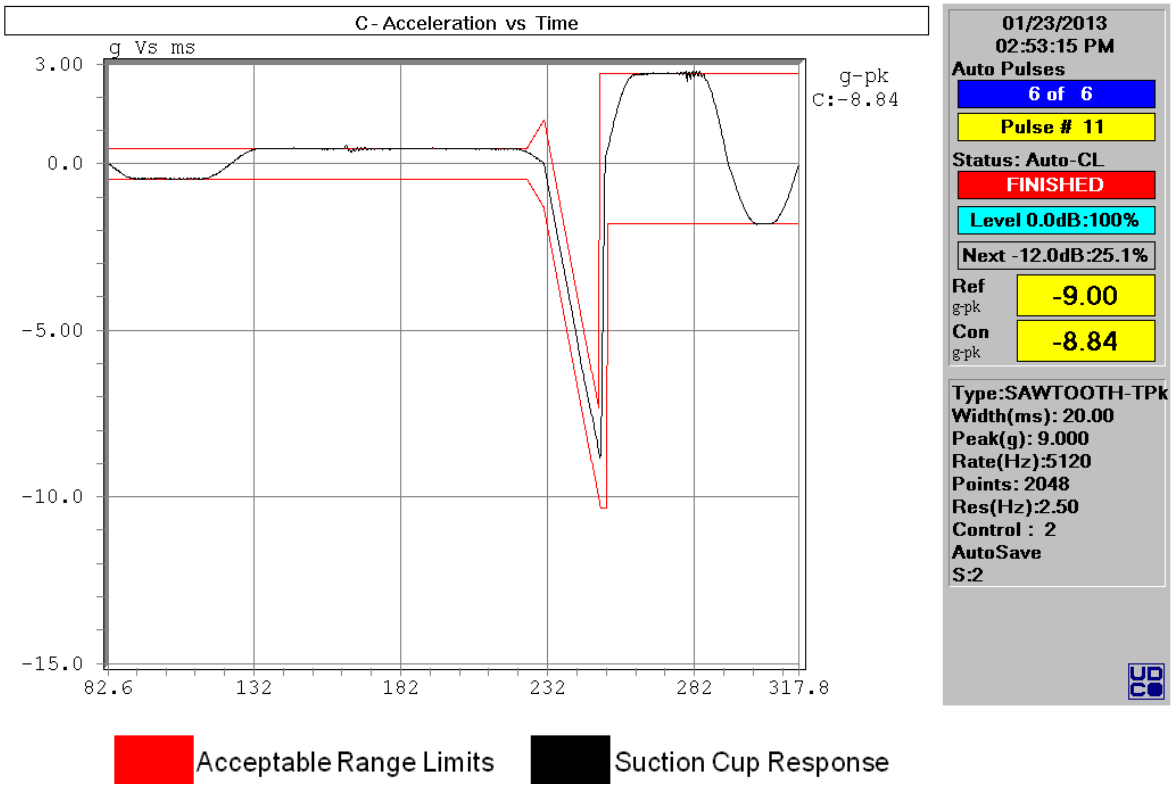
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

9G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup F
Op Shock 9 G's 20 ms
RUN NAME: run13
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 9.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	**Level (dB)**	**Level (%)**	**Pulses #**	**Polarity (+/-)**	**Delay (ms)**	**Mode (O/C)**
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

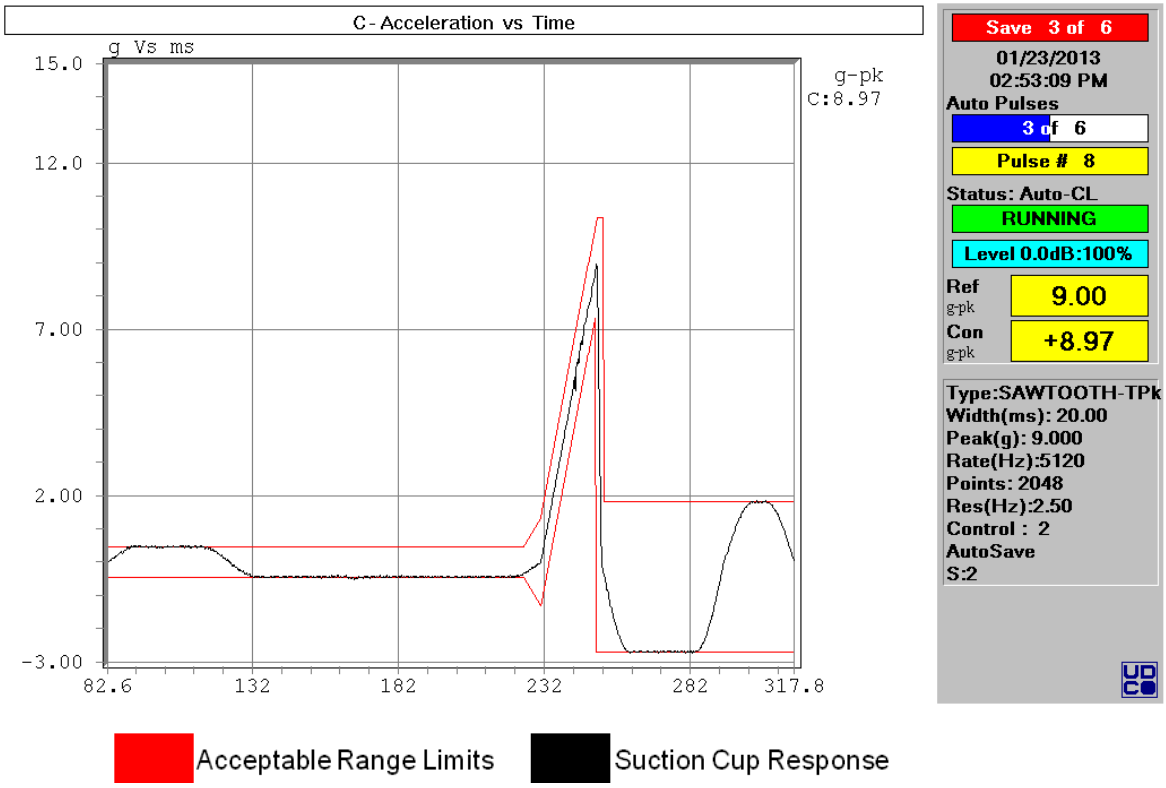
Seq#	**From**	**To**	**# Times**
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

9G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Front to Back Axis
Suction Cup F
Op Shock 9 G's 20 ms
RUN NAME: run13
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 9.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

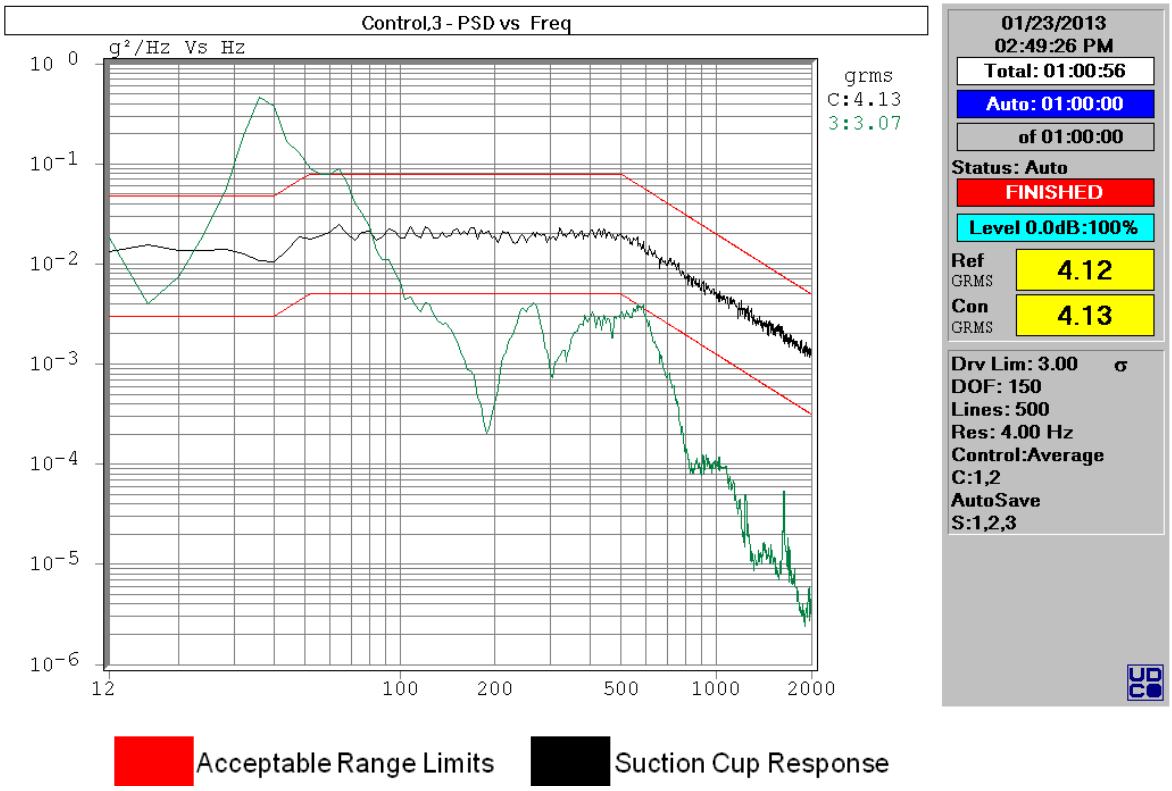
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup F
IPad installed
Front to Back Axis
Random Curve C
RUN NAME: run11
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

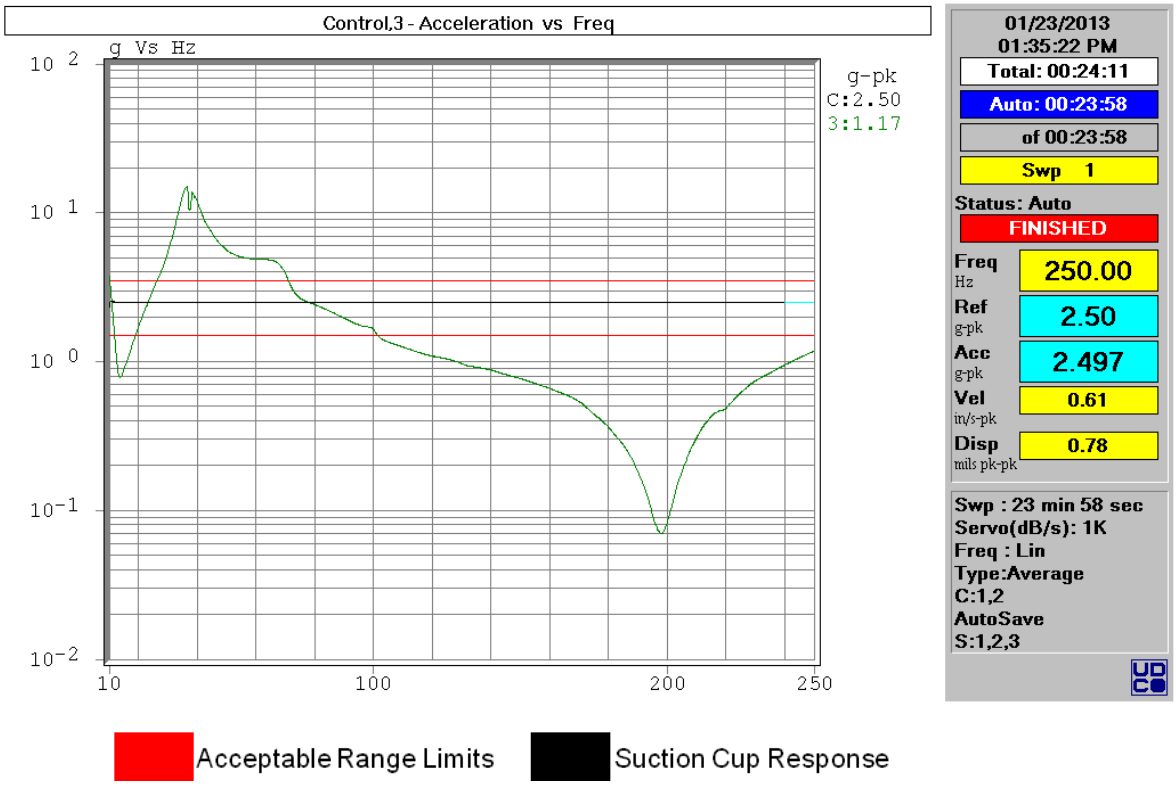
LEVEL SCHEDULE

Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R
Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
IPad Installed
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS11
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS39
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

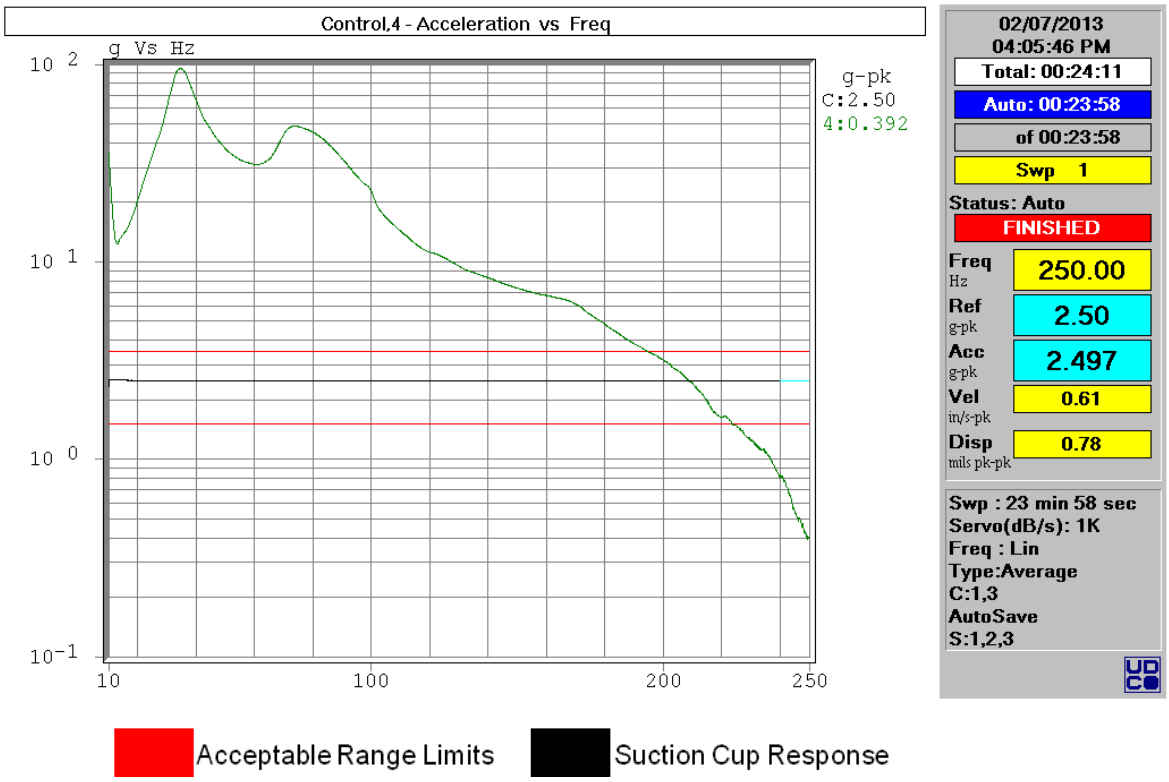
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
Ipad Installed
Cleaned windshield with cleaner prior to run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS25
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Painted Surface

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
Ipad Plate Installed
Painted Surface Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS58
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

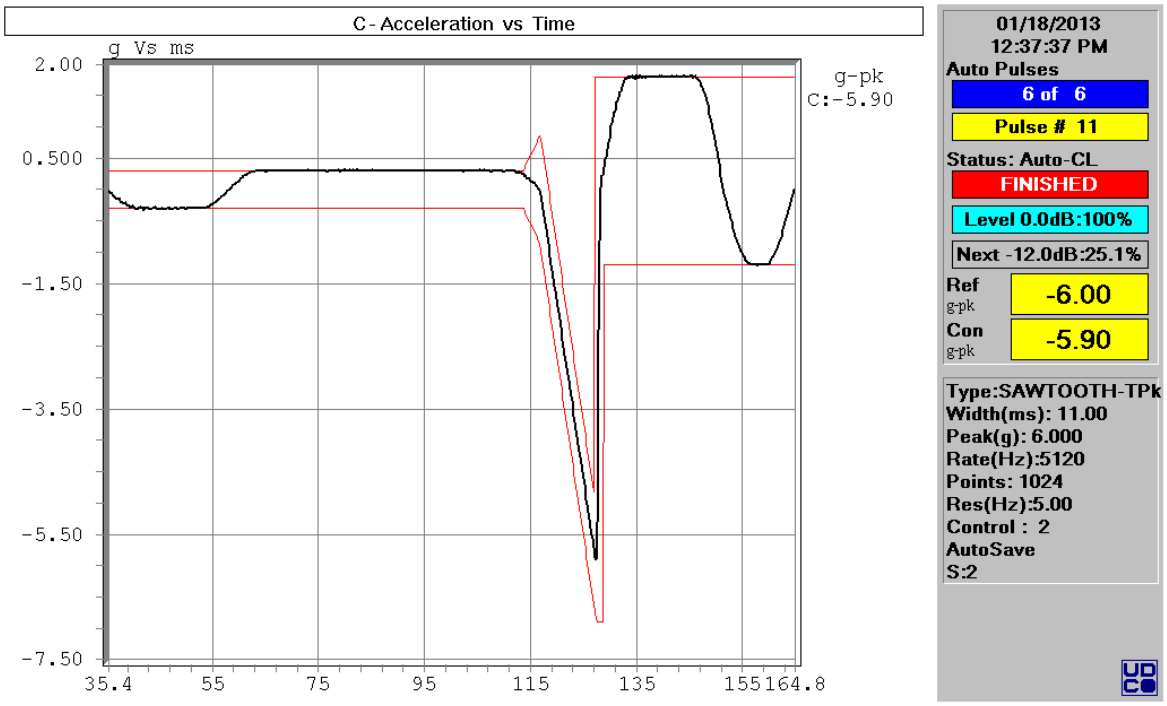
UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup F – Side to Side Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup F
Op Shock 6 G's 11 ms
RUN NAME: run9
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

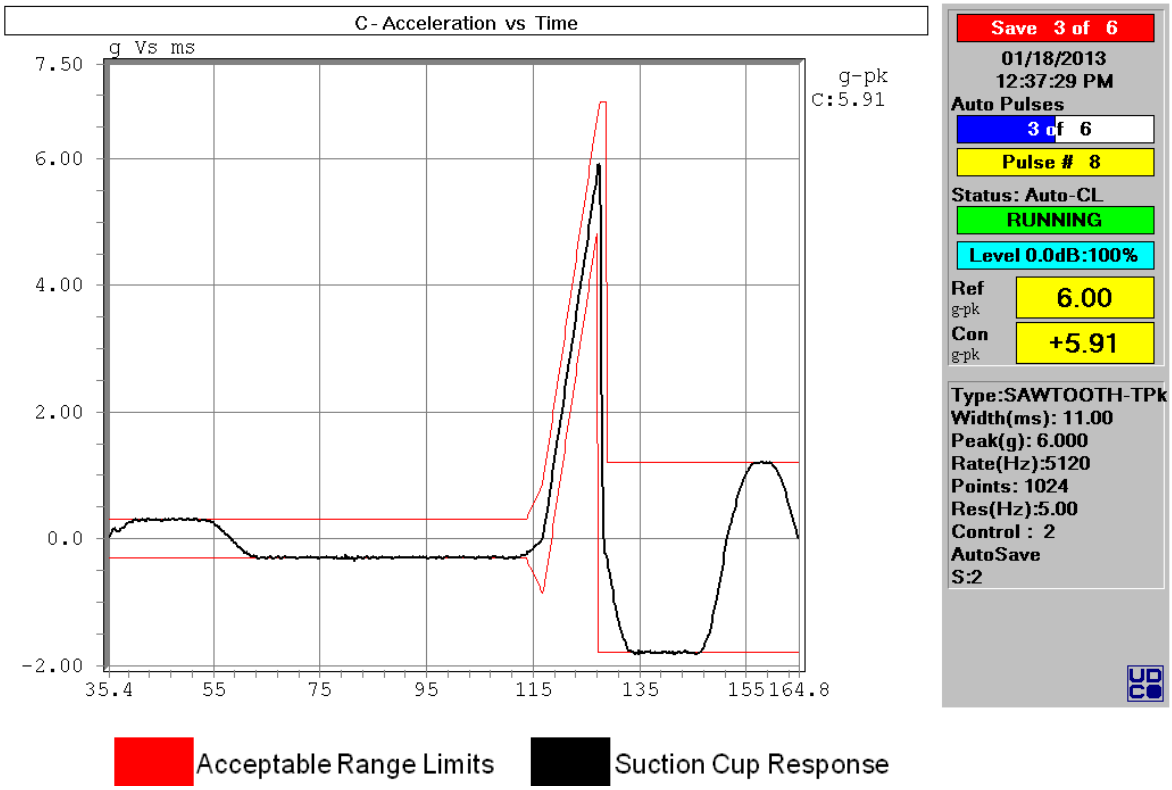
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup F
Op Shock 6 G's 11 ms
RUN NAME: run9
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

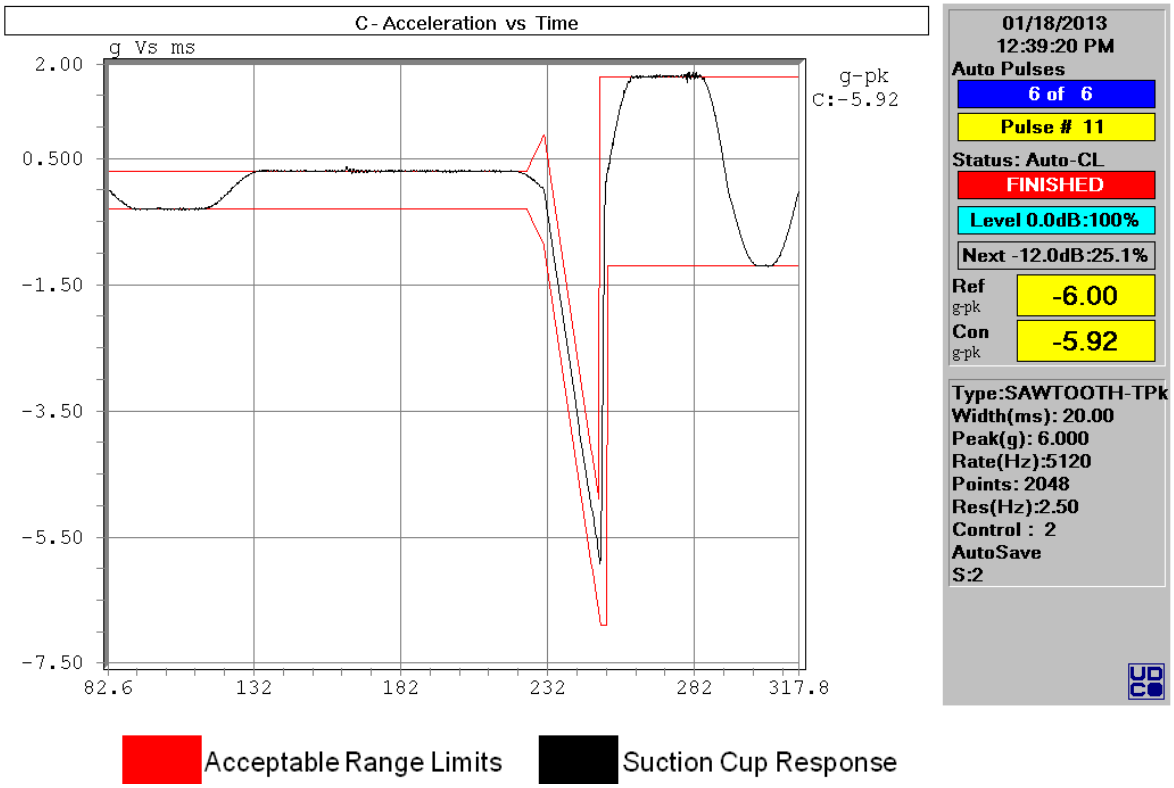
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup F
Op Shock 6 G's 20 ms
RUN NAME: run2
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

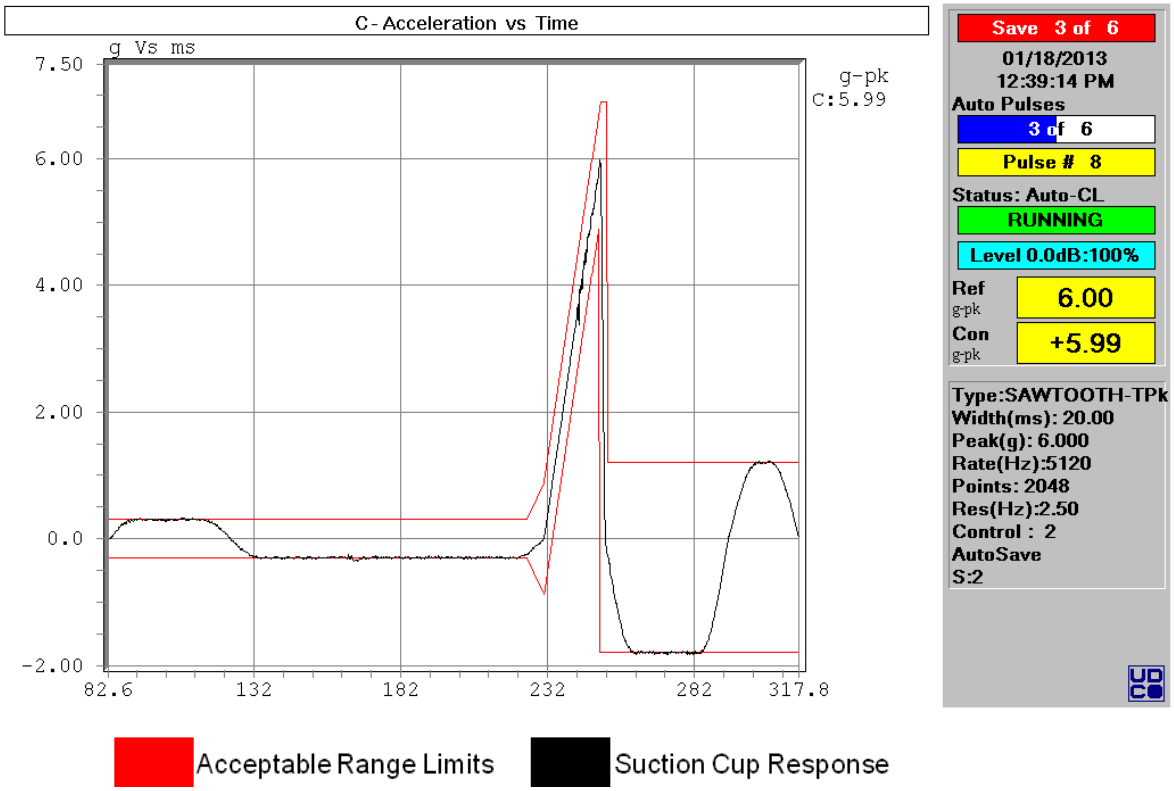
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Shock 6 G 20 ms
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Side to Side Axis
Suction Cup F
Op Shock 6 G's 20 ms
RUN NAME: run2
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 2.50 Hz/ 400.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 20.00 ms
TOTAL PULSE DURATION: 235.14 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

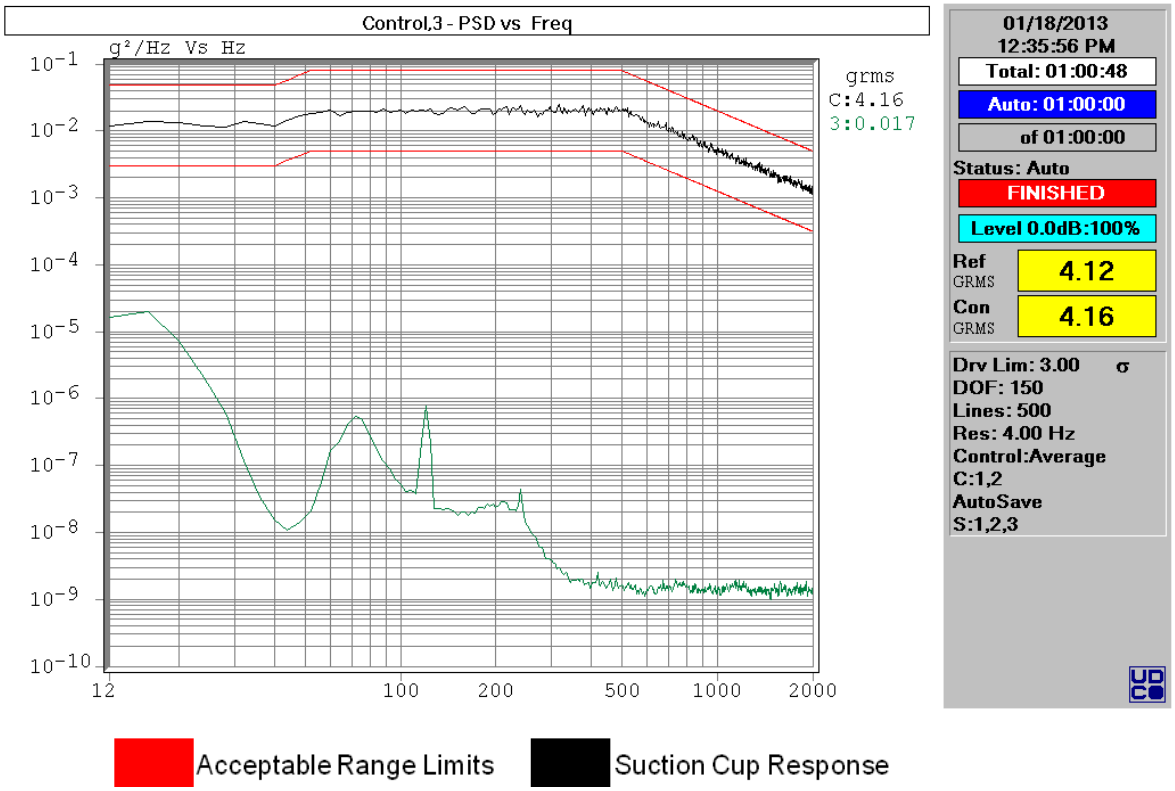
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup F
IPad installed
Side to Side Axis
Random Curve C
RUN NAME: run4
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

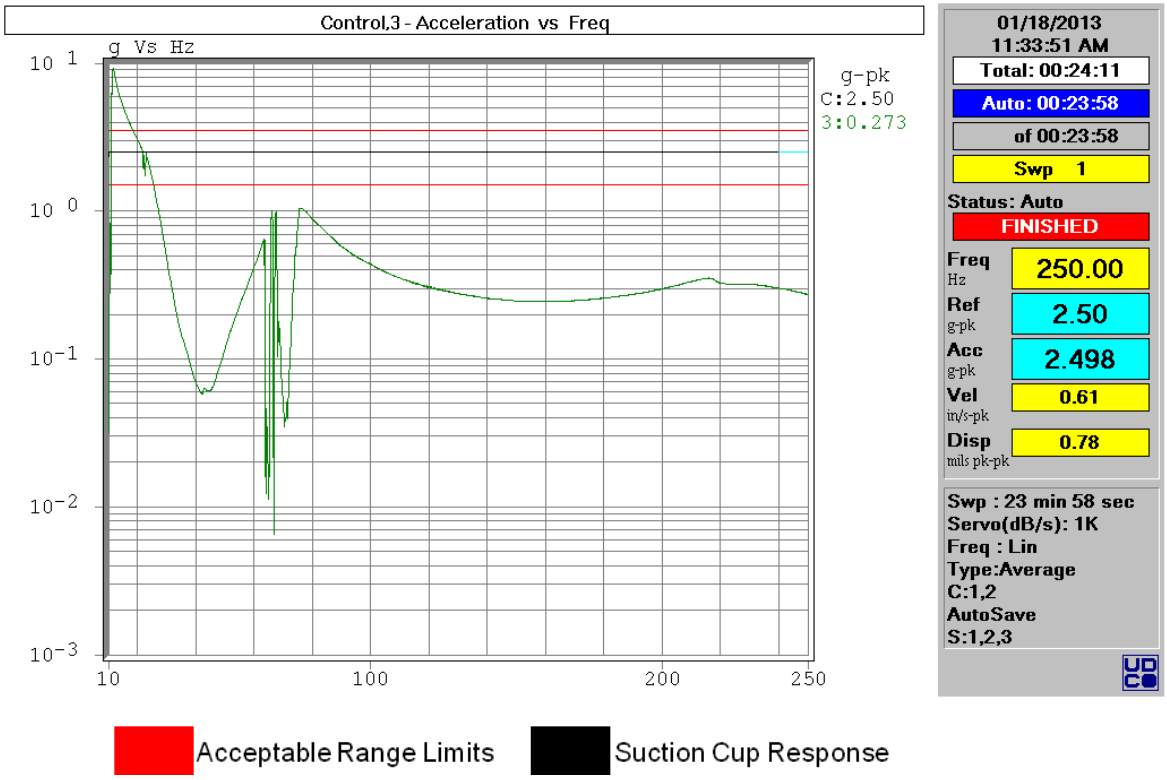
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
IPad Installed
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS4
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

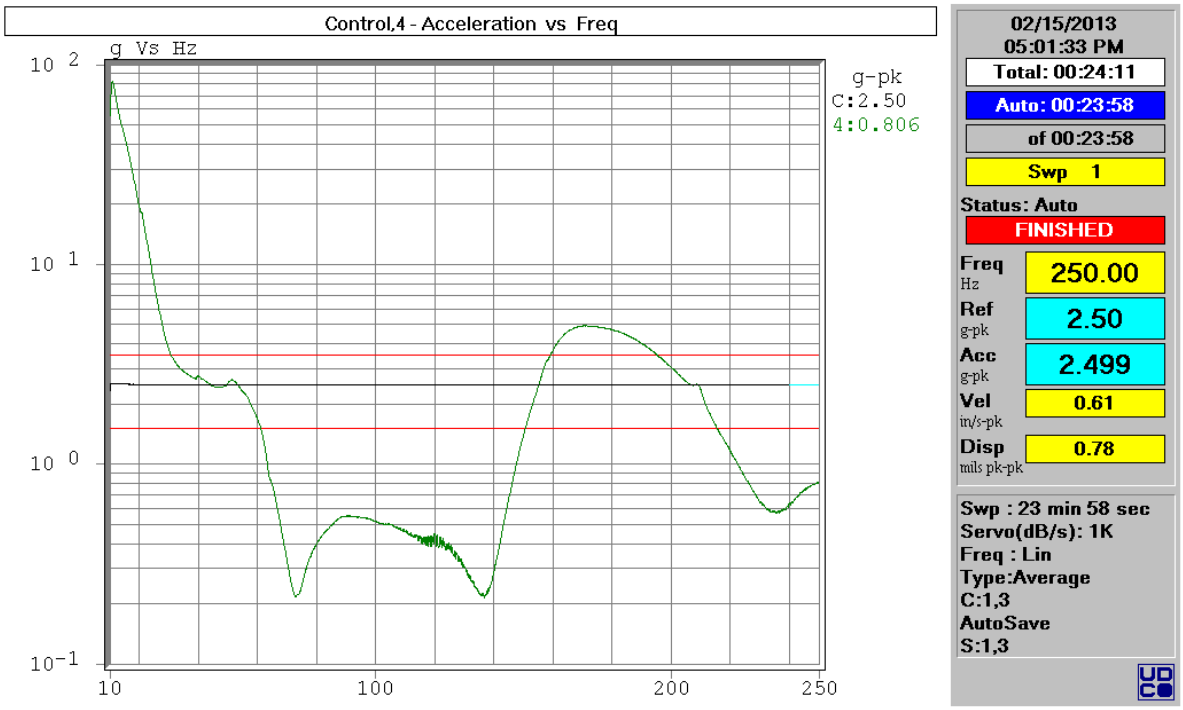
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS44
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

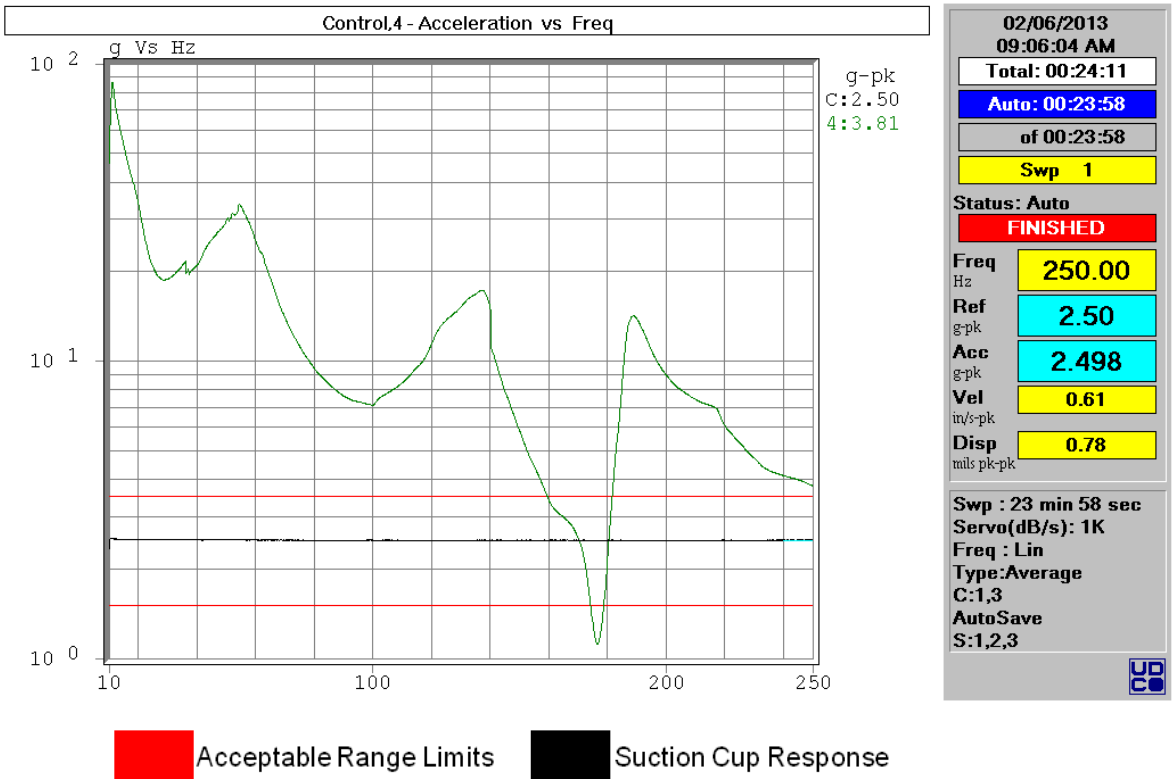
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
Dummy Load for IPad Installed
Cleaned windshield with cleaner prior to run
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS16
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

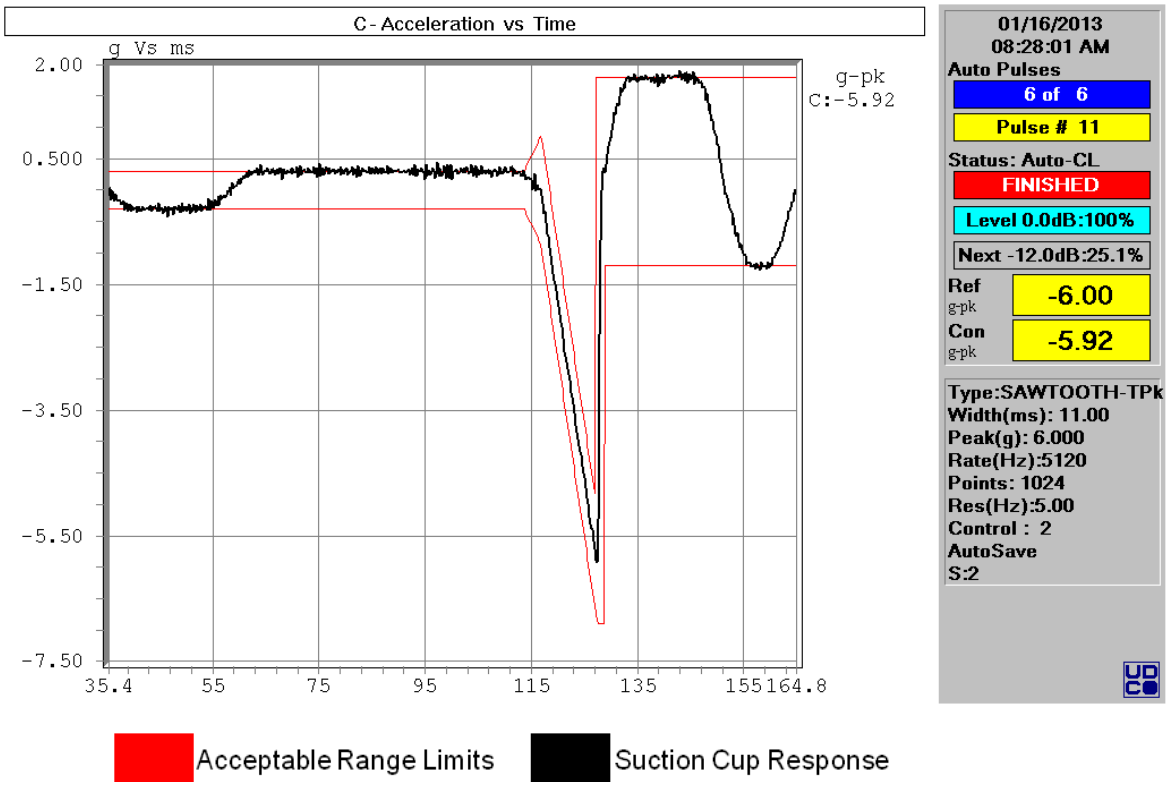
UNHOLTZ-DICKIE Vwin II Version 2.31

Suction Cup F - Vertical Axis

6G's 11ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup F
EPIC MCDU 2
Op Shock 6 G's 11 ms
RUN NAME: run1
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

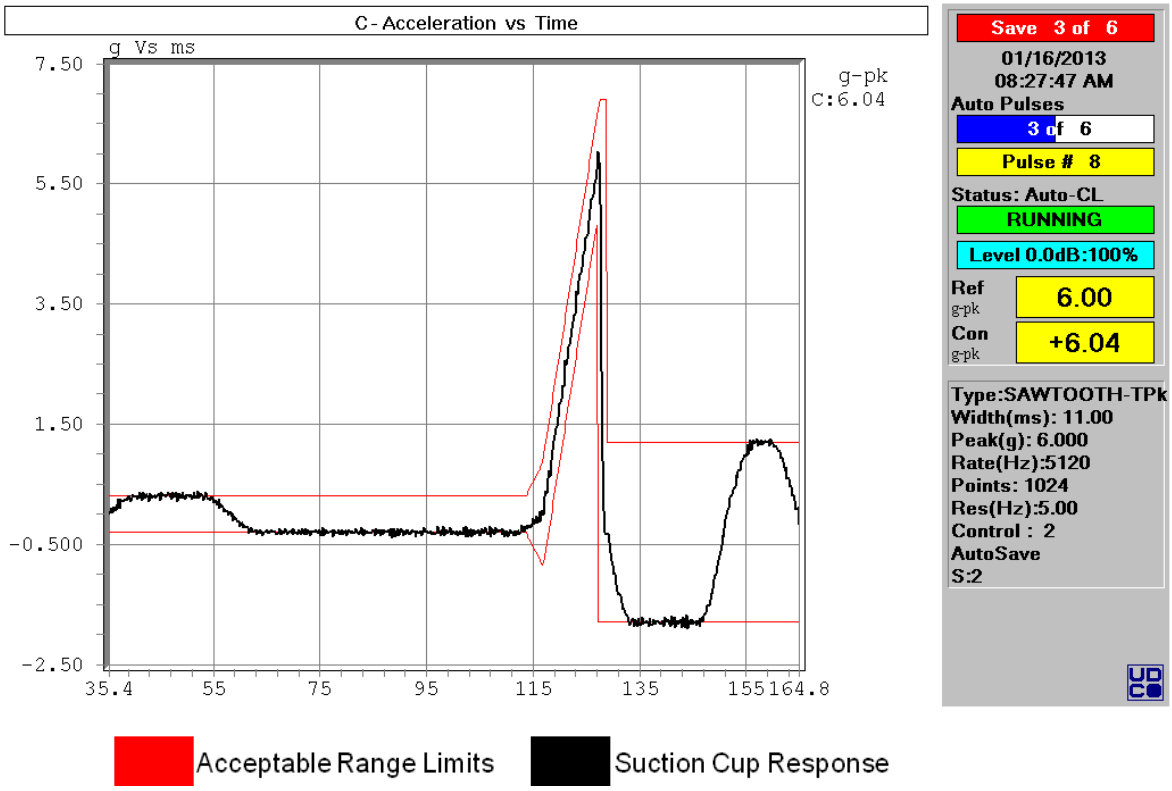
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 11ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup F
EPIC MCDU 2
Op Shock 6 G's 11 ms
RUN NAME: run1
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 5120.0 Hz
FFT POINTS: 1024
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

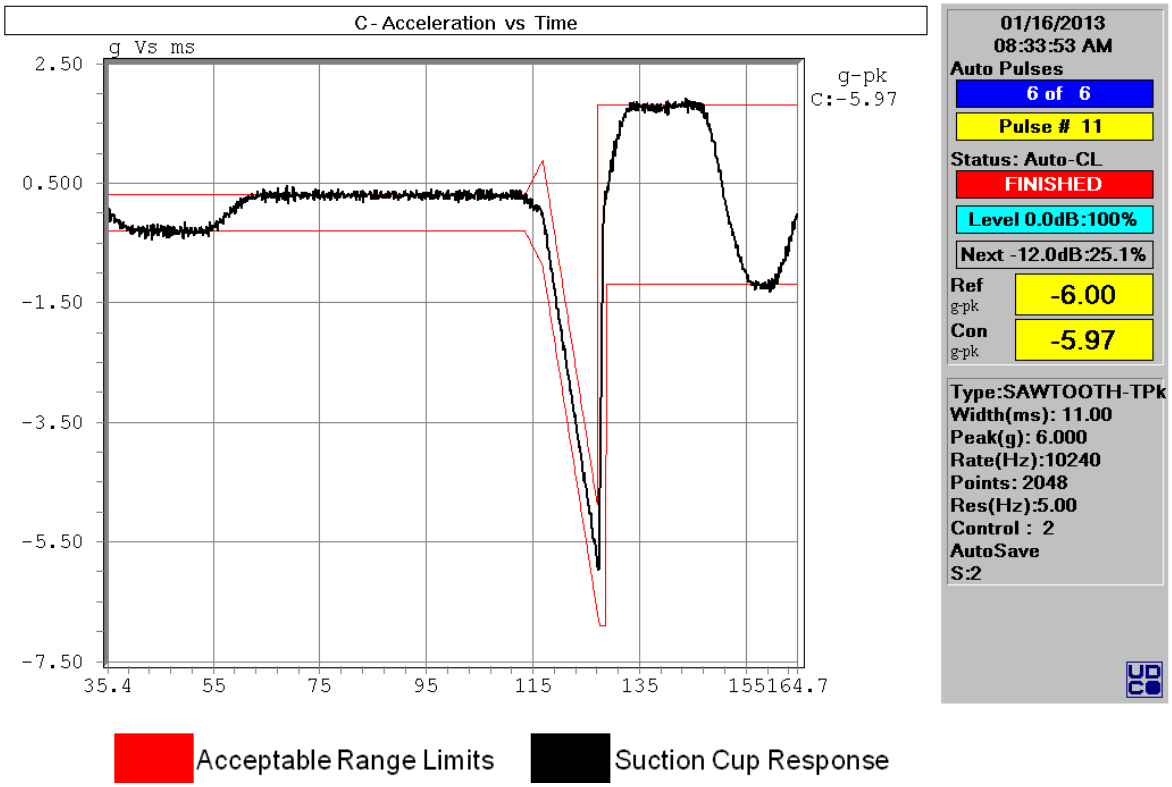
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

6G's 20ms, Negative Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup F
EPIC MCDU 2
Op Shock 6 G's 20 ms
RUN NAME: run2
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 10240.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

LEVEL SCHEDULE

Step #	Level (dB)	Level (%)	Pulses #	Polarity (+/-)	Delay (ms)	Mode (O/C)
1	0.00	100.00	3	+	500	C
2	0.00	100.00	3	-	500	C

LEVEL STEP SEQUENCE

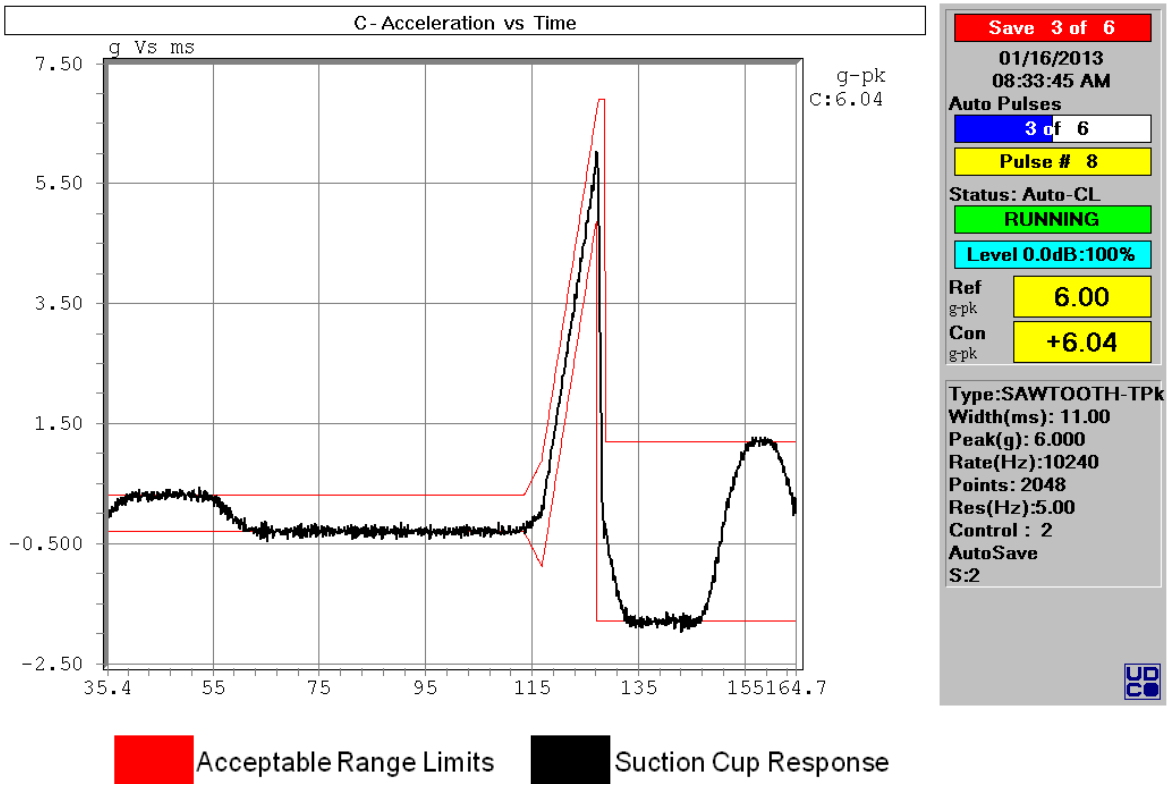
Seq#	From	To	# Times
1	1	2	1

UNHOLTZ-DICKIE Vwin II Version 2.31a

6G's 20ms, Positive Pulse

Classical Shock Test Report

SETUP NAME: Operational Standard
SETUP DESC: 6G 11MS SHOCK
SETUP COMMENTS: Vertical Axis
Suction Cup F
EPIC MCDU 2
Op Shock 6 G's 20 ms
RUN NAME: run2
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 3



CONTROL PARAMETERS

CONTROL CHANNEL(S): 2
SAMPLE RATE: 10240.0 Hz
FFT POINTS: 2048
FREQ. RESOLUTION/ TIME FRAME: 5.00 Hz/ 200.00 ms
MAXIMUM CONTROL FREQUENCY: 40% of Sample Rate
DISCOUNT AVERAGING: 2

TEST REFERENCE PARAMETERS

WAVE TYPE: SAWTOOTH - TERMINAL PEAK
PULSE WIDTH: 11.00 ms
TOTAL PULSE DURATION: 129.33 ms
REFERENCE PEAK: 6.00 g
COMPENSATION (% OF PEAK)
PRE POSITIVE: 5.00
PRE NEGATIVE: 5.00
POST NEGATIVE: 30.00
POST POSITIVE: 20.00

TEST STARTUP & SCHEDULE PARAMETERS

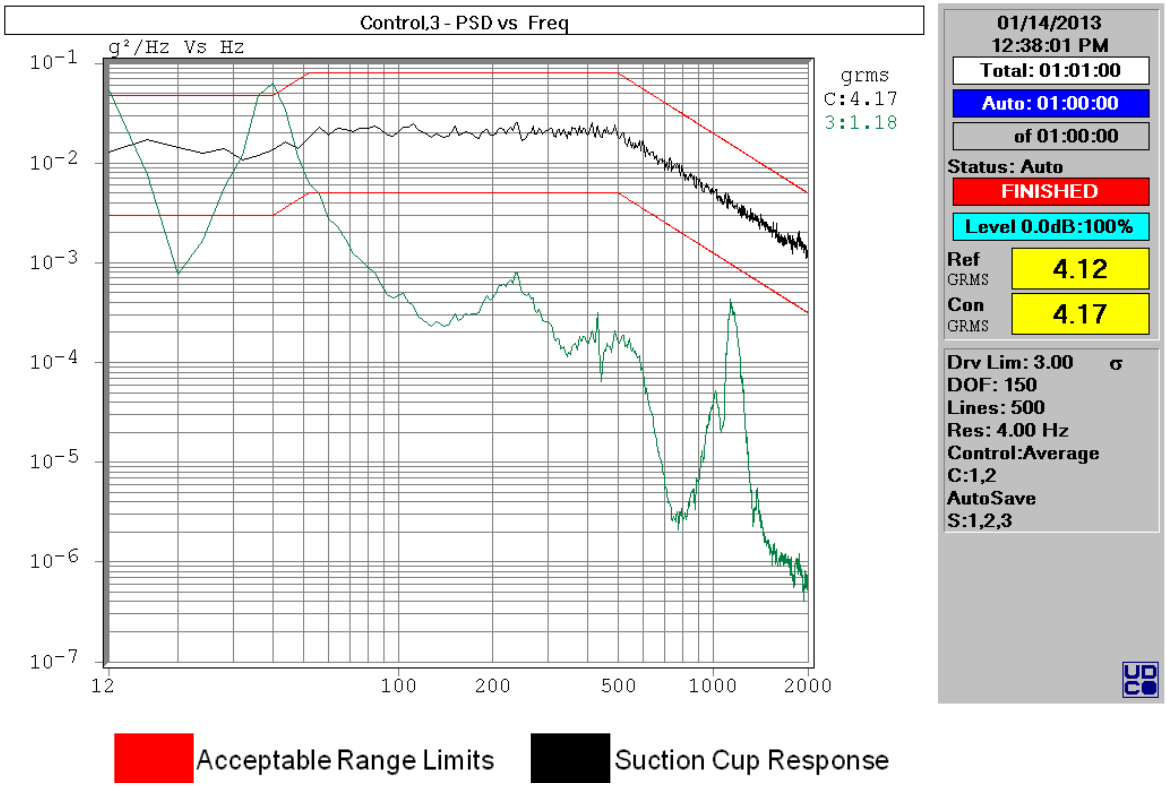
START LEVEL: -12.00 dB, (25.12% of full level)
TOTAL AUTO SCHEDULE PULSES: 6

UNHOLTZ-DICKIE Vwin II Version 2.31

Random Curve C

Random Test Report

SETUP NAME: Curve C
SETUP DESC: Curve C
SETUP COMMENTS: Suction Cup F
IPad installed
Vertical Axis
Random Curve C
RUN NAME: run30
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
FREQUENCY RANGE: 2000 Hz
NUMBER OF PSD LINES: 500
FREQUENCY RESOLUTION: 4.000 Hz
DOF: 150
SIGMA DRIVE LIMITING: 3.00

REFERENCE BREAK POINT TABLE

BP #	Freq Hz	Level (g^2/Hz)	Slope (dB/oct)	Alarm- (-dB)	Alarm+ (+dB)	Abort- (-dB)	Abort+ (+dB)
1	10.00	0.0119577		-3.00	3.00	-6.00	6.00
2	40.00	0.0119577		-3.00	3.00	-6.00	6.00
3	51.70	0.0199295		-3.00	3.00	-6.00	6.00
4	500.00	0.0199295		-3.00	3.00	-6.00	6.00
5	2000.00	0.0012556		-3.00	3.00	-6.00	6.00

Accel: 4.12 g rms, Est. Vel: 7.89 in/s pk, Est. Disp: 0.19 in pp

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
AUTO RAMP RATE: MEDIUM
AUTO RANGE SETTLE PERIOD: FAST
AUTO MODE TIMER BEGINS AT LEVEL SCHEDULE STEP: ALL/ANY STEP(S)
TEST DURATION (HH:MM:SS): 01:00:00

LEVEL SCHEDULE

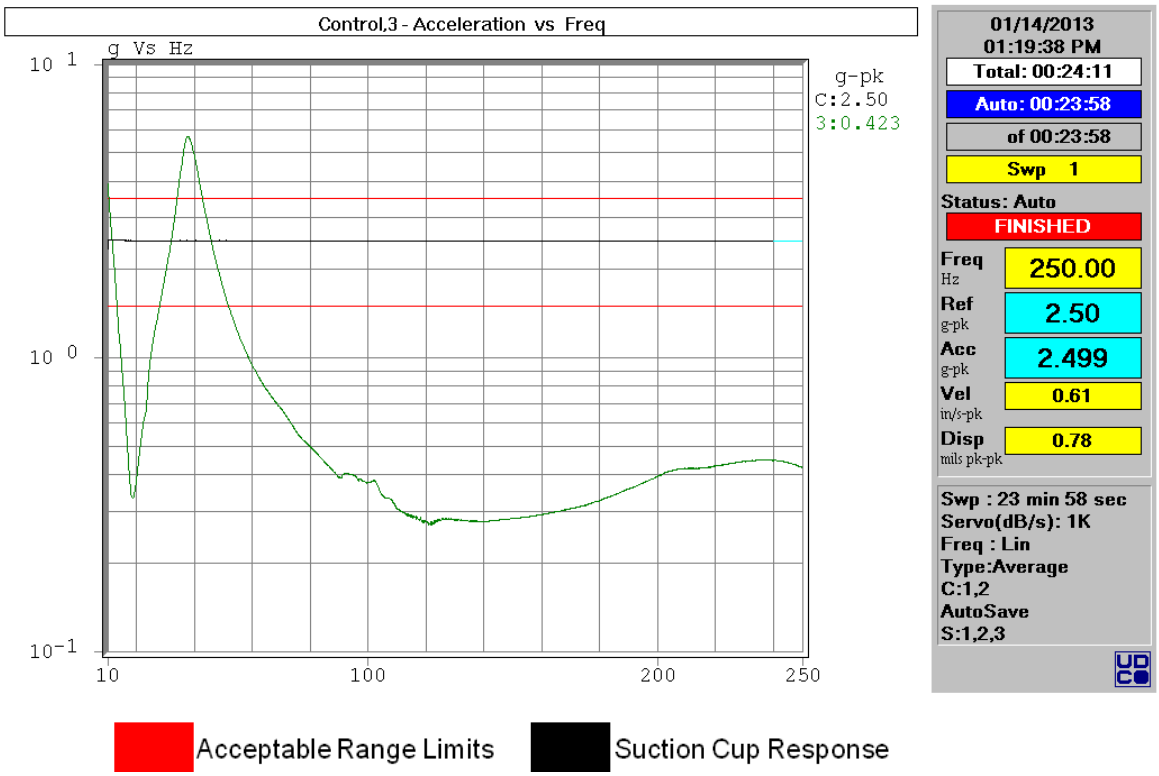
Step #	Level (-dB)	Level (%)	Duration (HH:MM:SS)
1	0.00	100.00	01:00:00

UNHOLTZ-DICKIE Vwin II Version 2.31

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
IPad Installed
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS2
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

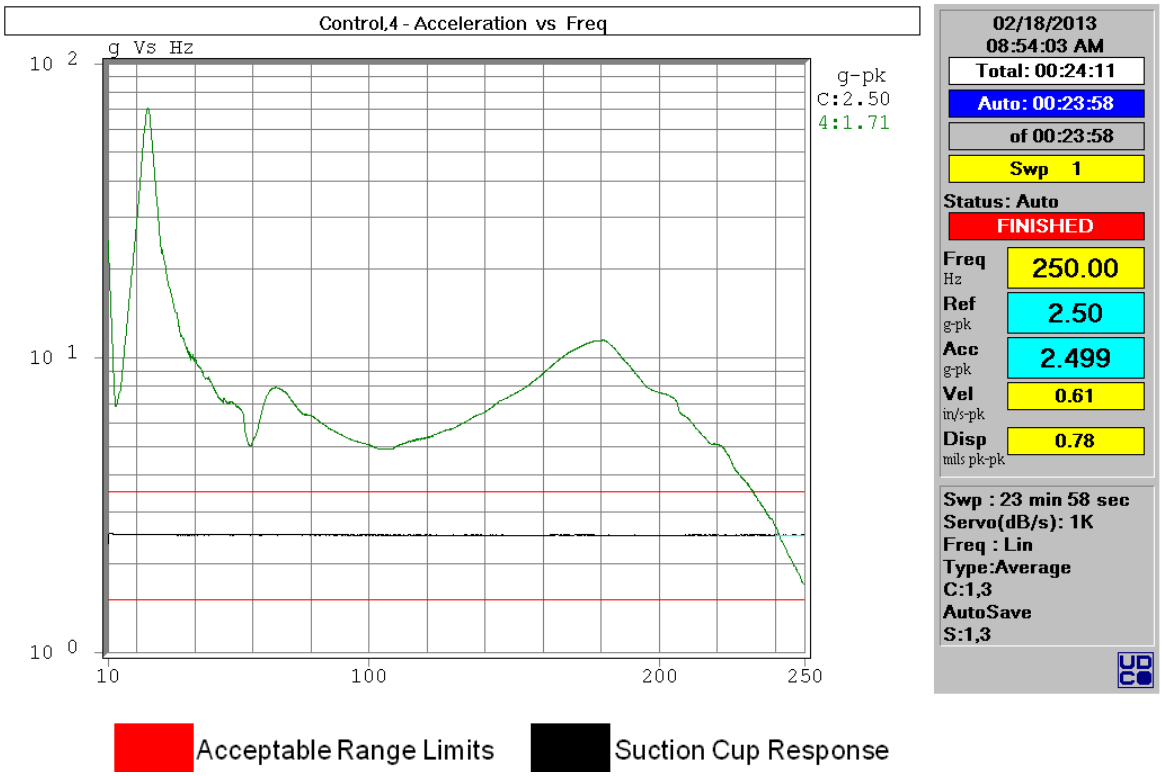
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Chicken Oil on Windscreen

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
Ipad Plate Installed
Chicken Oil Applied to Windshield Prior to Run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS49
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

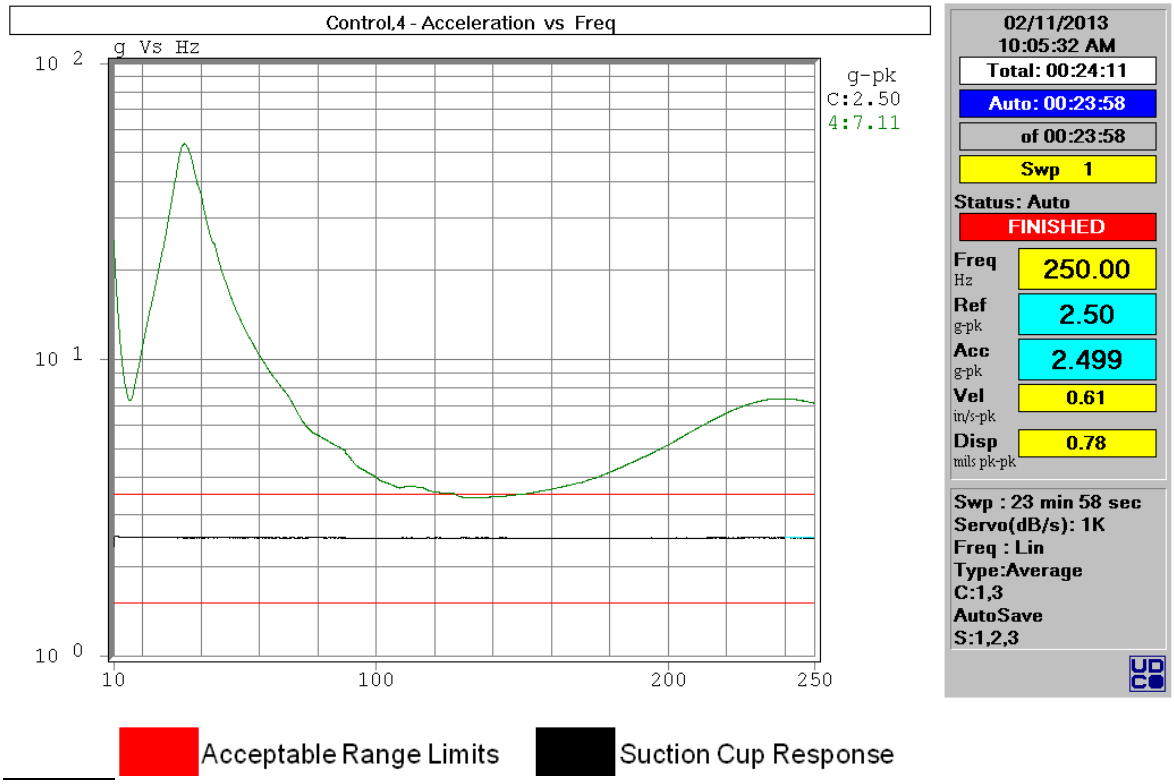
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Cleaned with Windscreen Cleaner

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
Ipad Installed
Cleaned windshield with cleaner prior to run
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS31
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,3
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

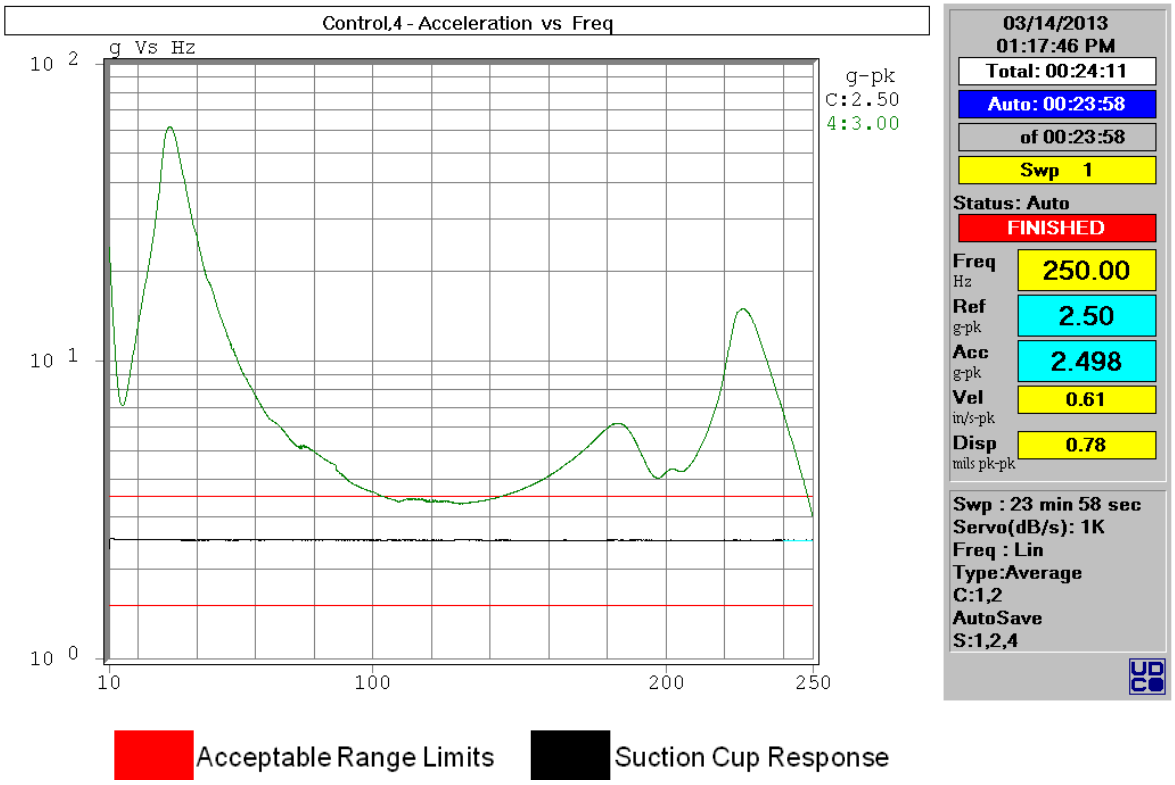
START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Painted Surface

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Suction Cup F
Ipad Plate Installed
Painted Surface
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS54
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31

Dust on Windscreen

Suction Cup F fell off of the plastic windshield before vibration could be started (About 10 minutes after attachment).

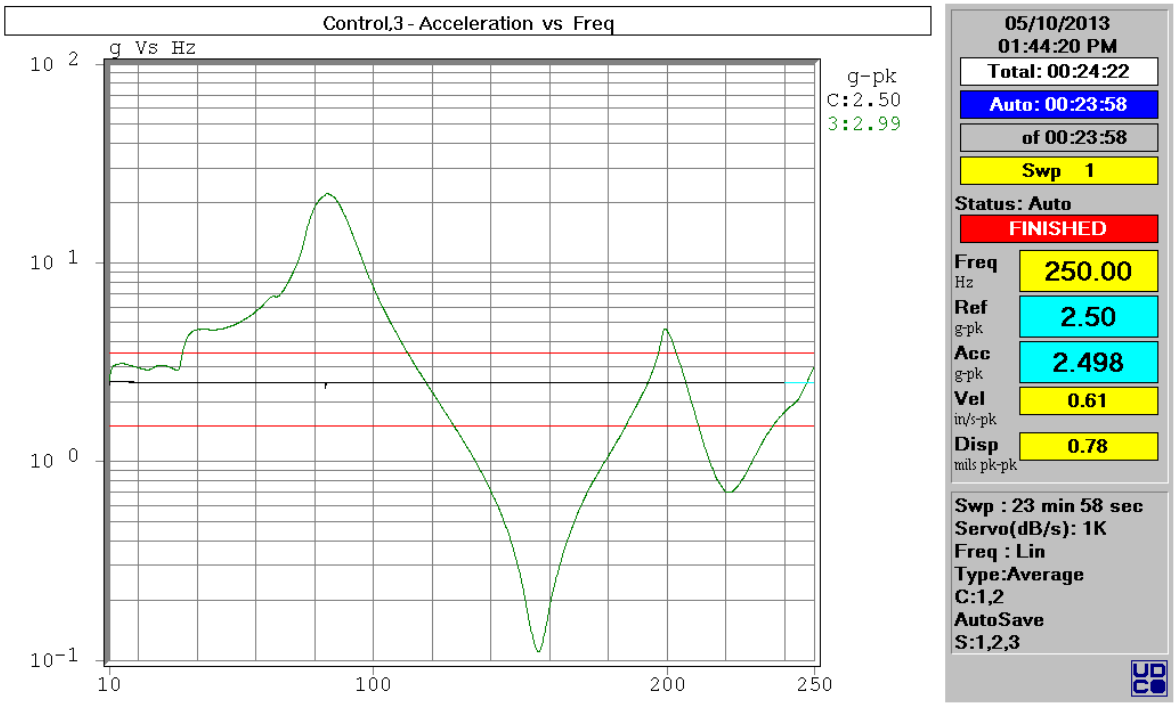
Yoke Securing Solution

Front to Back Axis

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Yoke Securing Solution
Ipad Plate Installed
Front to Back Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS66
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



Acceptable Range Limits Suction Cup Response

CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz

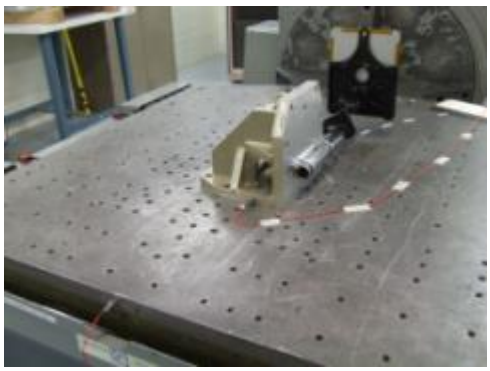
SERVO SPEED: 1K dB/s
REFERENCE SEGMENT TABLE

Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

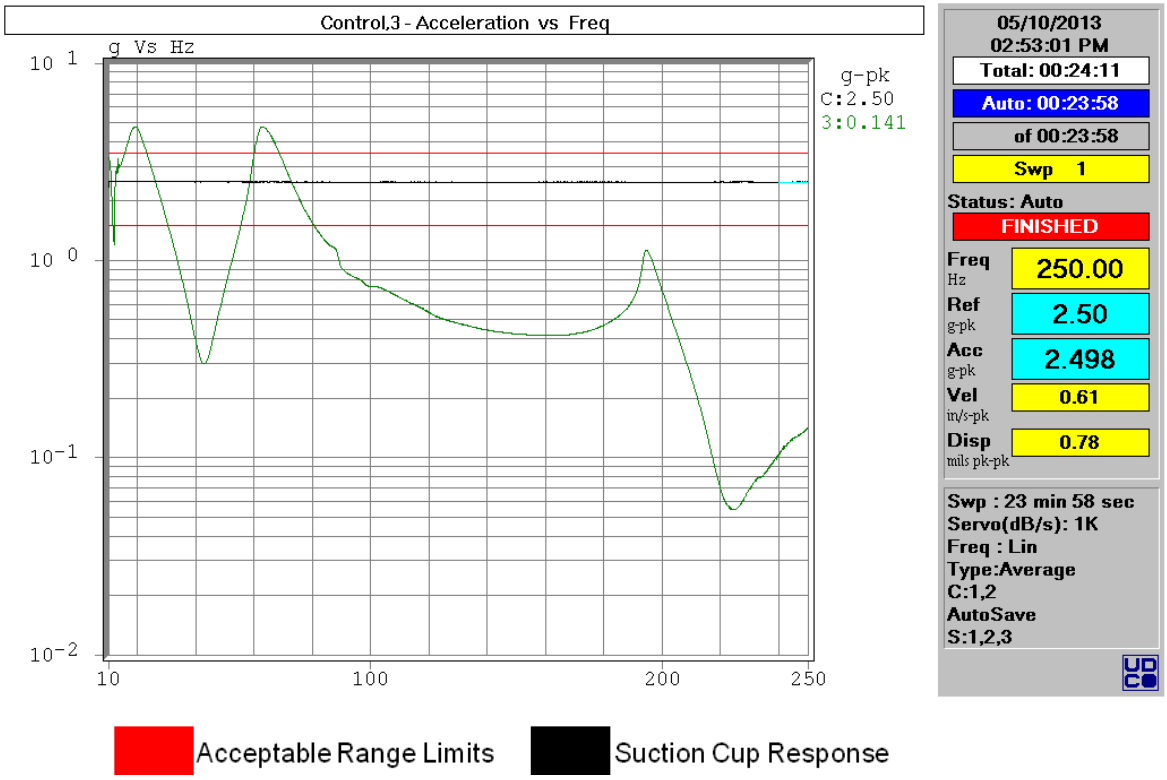
UNHOLTZ-DICKIE Vwin II Version 2.31



Yoke Securing Solution – Side to Side Axis
Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Yoke Securing Solution
Ipad Plate Installed
Side to Side Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS67
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

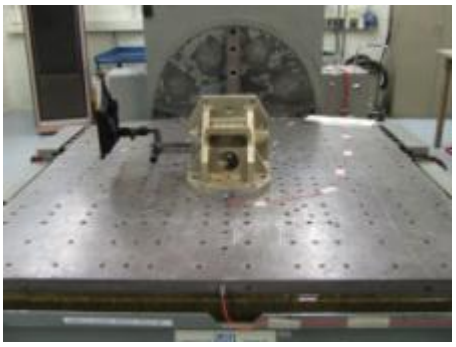
REFERENCE SEGMENT TABLE

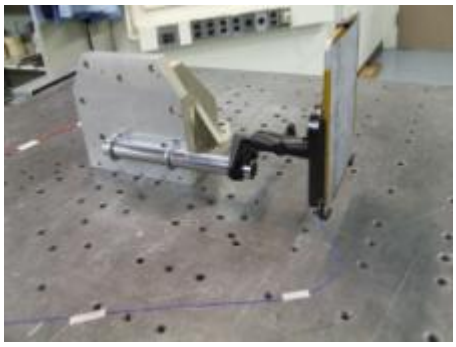
Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31



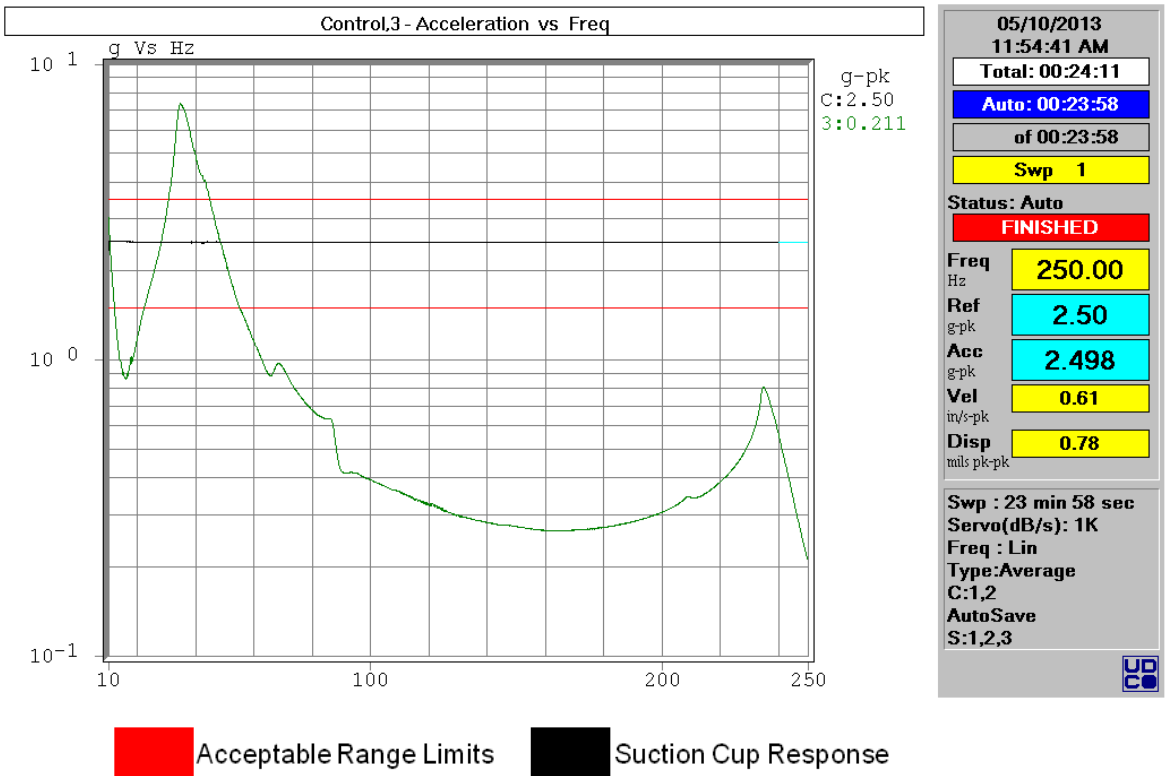


Yoke** Securing Solution* ***- Vertical Axis

Sine Curve R

Swept Sine Test Report

SETUP NAME: High Level Short Duration Curve R
SETUP DESC: Cat H 10-250 Hz @2.5g
SETUP COMMENTS: Yoke Securing Solution
Ipad Plate Installed
Vertical Axis
Sine Curve R
RUN NAME: HIGH LEVEL SHORT DUR LAT AXIS65
USER/PROJECT FOLDER: Suction Cups
SAVE NUMBER: 1



CONTROL PARAMETERS

CONTROL CHANNEL(S): 1,2
CONTROL TYPE: AVERAGE
SWEEP TIME: 23 min, 58 sec
SWEEP TYPE: LINEAR
STARTING SWEEP DIRECTION: UP
STARTING FREQUENCY: 10.00 Hz
LOWER FREQUENCY: 10.00 Hz
UPPER FREQUENCY: 250.00 Hz
SERVO SPEED: 1K dB/s

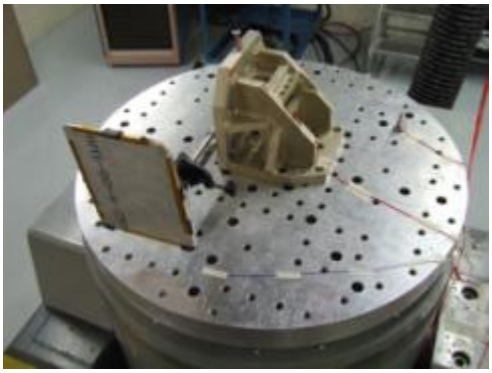
REFERENCE SEGMENT TABLE

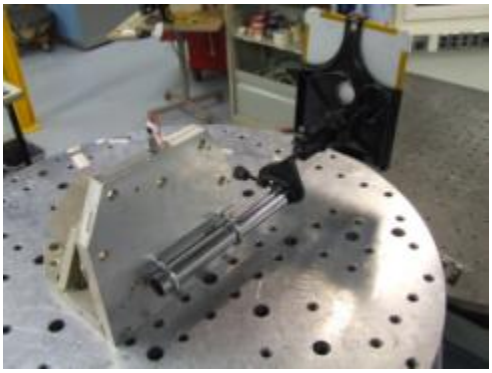
Seg #	Freq Hz	Type DAVS	Disp mil pp	Accel g pk	Vel in/s pk	Alarm- (-%)	Alarm+ (+%)	Abort- (-%)	Abort+ (+%)
1	10.00	A	488.987	2.500	15.362	30.00	30.00	40.00	40.00
2	250.00	A	0.782	2.500	0.614	30.00	30.00	40.00	40.00

TEST STARTUP & SCHEDULE PARAMETERS

START LEVEL: -12.00 dB, (25.12% of full level)
TEST DURATION (HH:MM:SS): 00:23:58

UNHOLTZ-DICKIE Vwin II Version 2.31





Humidity

EQUIPMENT LIST

HUMIDITY CHAMBER #1

HUMIDITY CHAMBER TYPE:	Thermotron
Model:	FM-35-CHM-5-810C
S/N:	21-8904
PCN:	SFS-16491

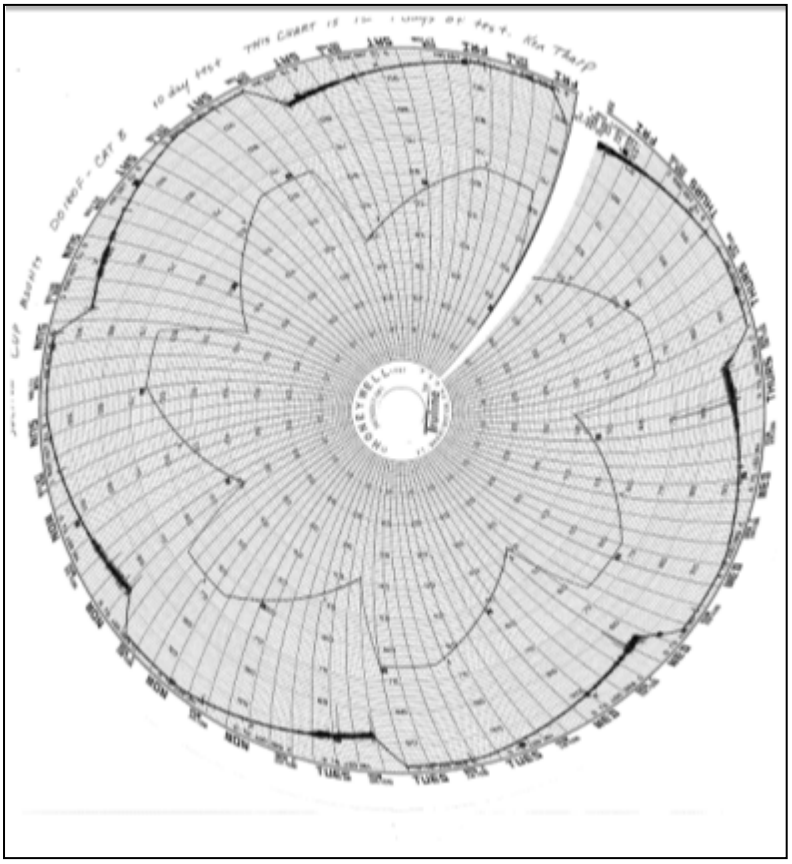
CONTROLLER:

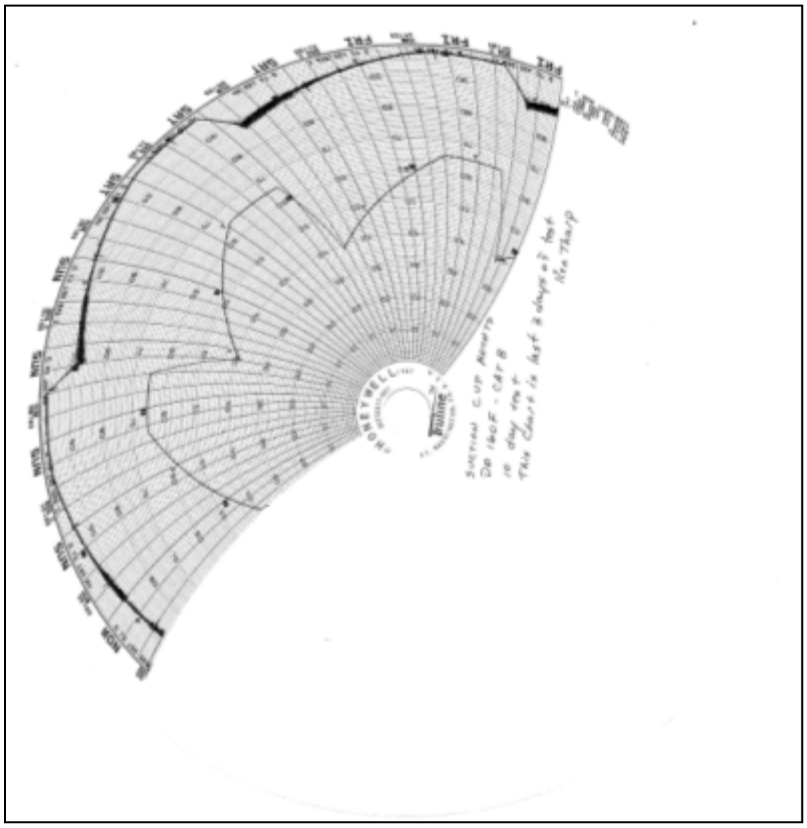
TYPE:	Thermotron
MODEL:	7800 Control System
CAL'D	17 Jan. 2013
DUE CAL:	17 July 2013

CHART RECORDER:

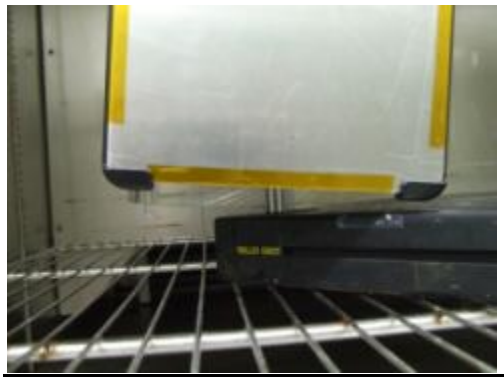
Type:	Honeywell Truline
HAS:	ID 24298

CHARTS





Start-Up Photos

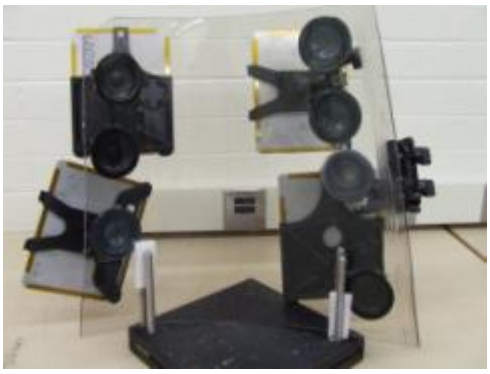


HUM
1
CHAMBER UP
& RUNNING

HUM
1

THERMOTRON
TEST IN PROGRESS
DO NOT DISTURB !!

Post-Humidity Photos



Altitude

EQUIPMENT LIST

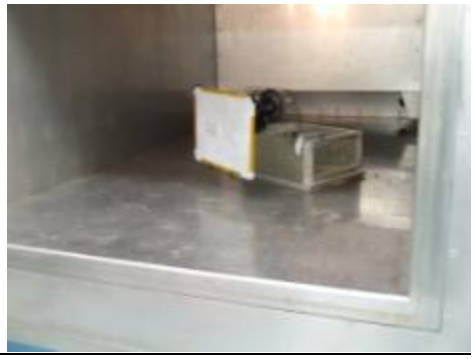
1) ALTITUDE CHAMBER
TYPE: THERMOTRON
MODEL: FA-45-CH-705-705
S/N: 22304
HAS: A13113A
DUE CAL: 5 Jun 2013
CAL: 5 Dec 2012

2) CHART RECORDER
TYPE: HONEYWELL
MODEL: DR4502-1100-00-000-0-UL-0111
CALIBRATION & ID part of system listed under ALTITUDE CHAMBER

3) ALTITUDE PROGRAMMER/CONTROLLER
TYPE: THERMOTRON
MODEL: 6850
CALIBRATION & ID part of system listed under ALTITUDE CHAMBER

Altitude Photos

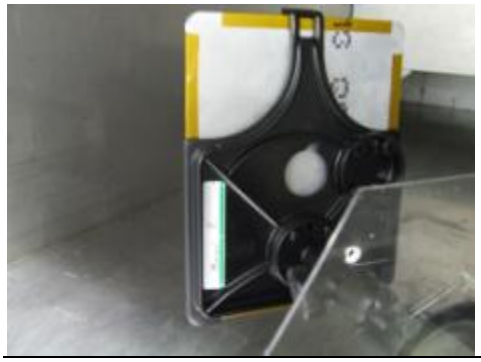
Suction Cup B – fell off at 27000 ft, 26950 ft, and 26878 ft.

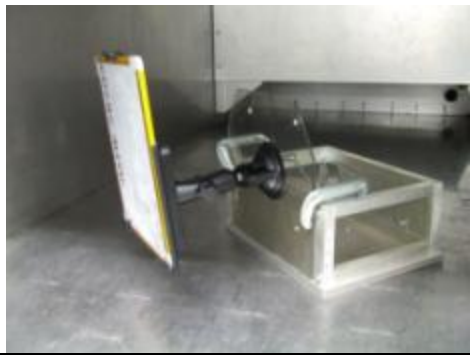


Suction Cup C – fell off at 27000 ft, 27100 ft, and 27050 ft

Suction Cup D – fell off at 26750 ft, 26890 ft, and 26940 ft

Suction Cup E – fell off at 27000 ft, 25500 ft and 26490 ft





Suction Cup F - fell off at 26975 ft, 26835 ft, and 26780 ft