111297 Samsung XCover Pro Charging Cradle PVT Testing
Date:
Started: July 10, 2020
Ended: July 14, 2020

Prepared By: Mark Lilly

Test Technician
Gamber-Johnson

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STS = Side to Side axis
FTB = Front to Back axis

Test Procedure

Unless otherwise specified, all tests were conducted in the following configuration:

111297 Samsung XCover Pro Charging Cradle – Production Quality Sample
Samsung XCover Pro Phone – Computer #1 (DLAMB02AD/2-B)
7160-0750– Clevis
SV1159 – Holding Fixture

Operational Vibration

The purpose of this test is to evaluate the detrimental effects of mechanical vibration, which may be encountered during normal operation of this product.

Operational random vibration per MIL-STD-810G, Method 514.6, Procedure 1, Category 4, per Figure 514.6C-1, for one hour along three mutually orthogonal axes (3 hours test time).

Non Operational Vibration

The purpose of this test is to evaluate the detrimental effects of mechanical vibration, which may be encountered during shipping, installation and normal use of this product.

Non-operational random testing is performed in accordance with section 4.1 of Gamber-Johnson's Product Validation Testing Specification (Rev C) Vibration is applied per MIL STD 810G, Method 514.6, Procedure I per Figure 514.6 E-1 for one hour along three mutually orthogonal axes (3 hours total test time). The computer is not operating and no power is supplied to the docking station.

GJ 20g Mechanical Shock Testing

The purpose of this test is to evaluate the detrimental effects of dynamic shock which may be encountered during normal use of the docking station. After non-operational mechanical shock testing is complete the unit is checked to assure no major degradation of performance and no physical damage to the unit has occurred. Shock testing is performed in accordance with section 4.3 of Gamber-Johnson's Product Validation Testing Specification (Rev C). 20g 11ms half sine wave pulses are injected in two directions per axis and three cycles per direction for a total of 18 pulses. Indicators that the tablet is charging and is docked as well as sound are monitored before and after the test.

GJ 40g Mechanical Shock Safety Testing

The purpose of this test is to evaluate the detrimental effects of severe dynamic shock which may be encountered during normal use of this product. After non-operational mechanical safety shock testing is complete the unit will be checked to assure the computer and docking station components remain secure during the testing.

Shock testing is performed in accordance with section 4.4 of Gamber-Johnson's Product Validation Testing Specification (Rev C). 40g 11ms half sine wave pulses are injected in two directions per axis and three cycles per direction for a total of 18 pulses. Fail criteria for this test is if anything becomes a projectile during the test.

Summary

During the ***pretest evaluation***, it was noted that the phone and cradle were confirmed fully functional. There were no issues or concerns.

Operational Vibration

Monitoring: Power, Battery Charging
All Axes;

- Battery charged throughout testing.
- There were no issues or concerns.

Non-Operational Vibration

All Axes;

- No dust and wear observed.

- The phone and cradle were confirmed fully functional.
- No immediate issues or concerns.

20g Shock; Non-Operational

All Axes;

- The phone and cradle were confirmed fully functional.
- No issues or concerns in any axes.

40g Shock; Non-Operational

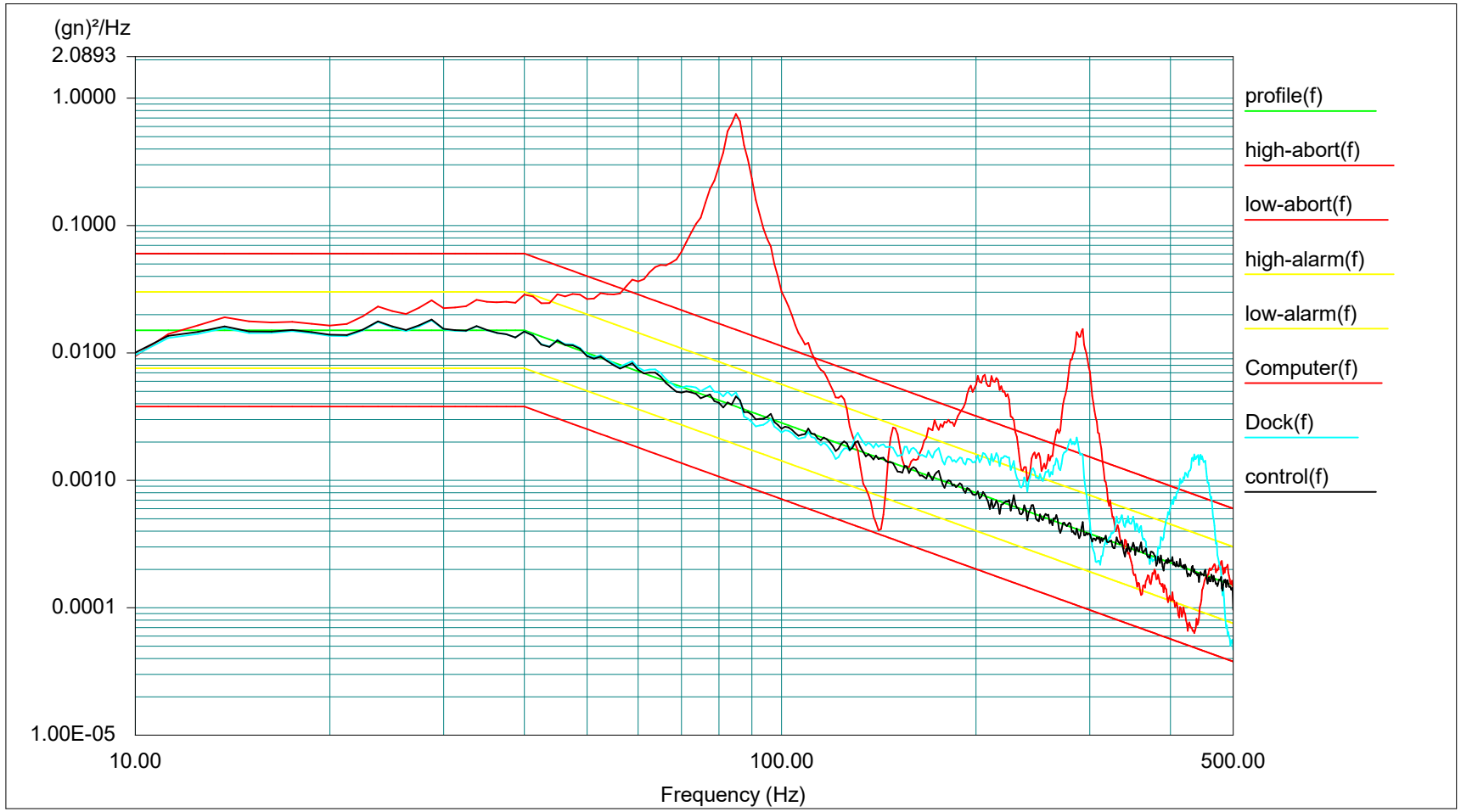
All Axes;

- There were no projectiles in any axes.
- There were no issues or concerns.
- The phone and cradle were confirmed fully functional.

Test Profiles

111297 Samsung XCover Pro Charging Cradle Operational Vibration Longitudinal Axis

DUT: Samsung Galaxy XCover Pro6 Phone, 111297 Samsung XCover Pro Cradle PVT Sample, 7160-0750, SV1159
Test Protocol: C1 vertical profile, 1 HR, FTB
Project File Name: C-1 Vertical Profile Long axis.prj
Profile Name: C-1 Vertical Test Type: Random Run Folder: .\RunFolder Jul 10, 2020 15-37-01



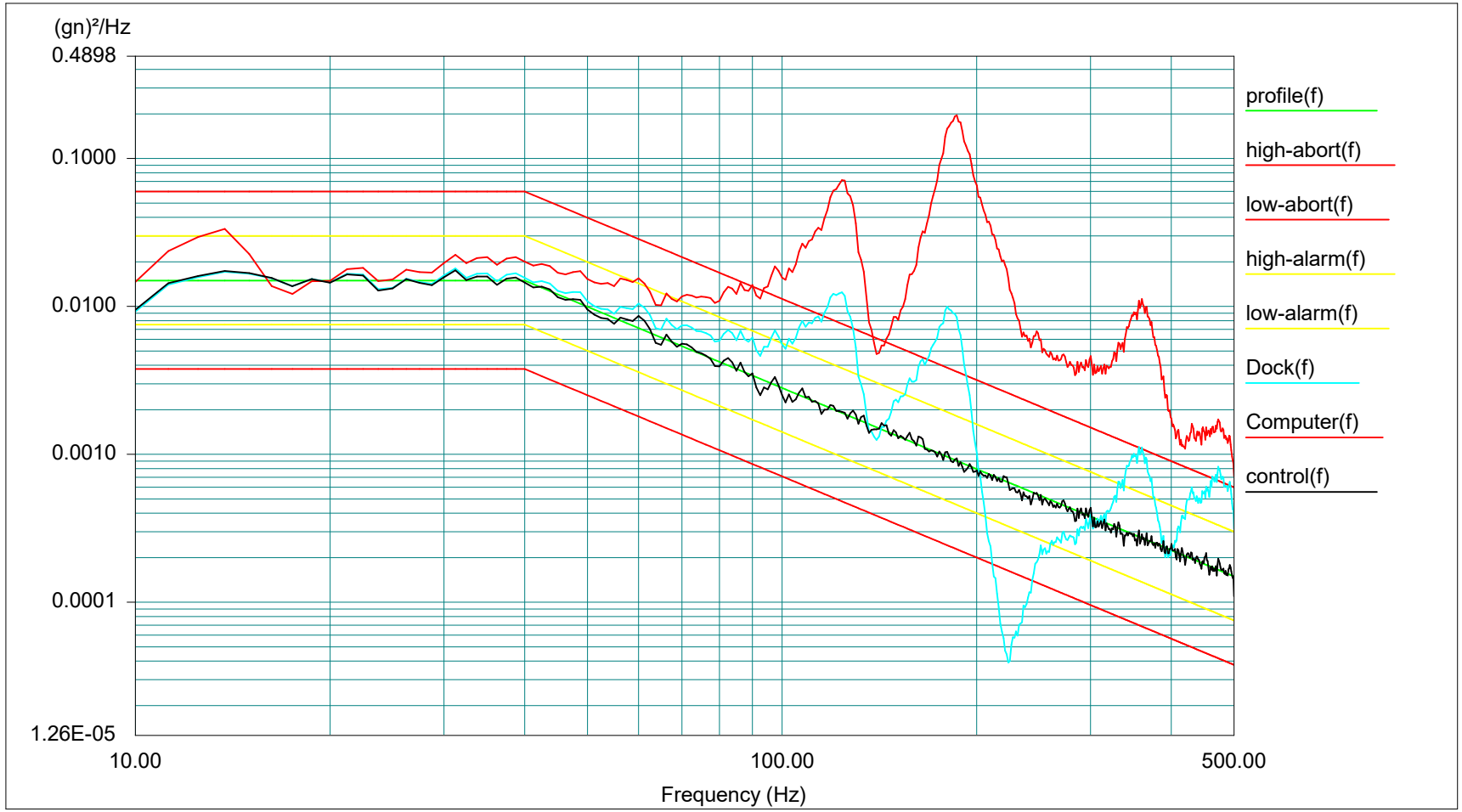
Level: 100 %

Control RMS:	1.040017 gn	Full Level Elapsed Time:	01:00:00	Lines:	400	Frame Time:	0.800000 Seconds
Demand RMS:	1.044836 gn	Remaining Time:	00:00:00	DOF:	154	dF:	1.250000 Hz

Data saved at 04:46:48 PM, Friday, July 10, 2020 Report created at 04:46:49 PM, Friday, July 10, 2020

111297 Samsung XCover Pro Charging Cradle Operational Vibration Transverse Axis

DUT: Samsung Galaxy XCover Pro6 Phone, 111297 Samsung XCover Pro Cradle PVT Sample, 7160-0750, SV1159
Test Protocol: C1 vertical profile, 1HR, STS
Project File Name: C-1 Vertical Profile Trans axis.prj
Profile Name: C-1 Vertical Test Type: Random Run Folder: .\RunFolder Jul 13, 2020 08-37-55



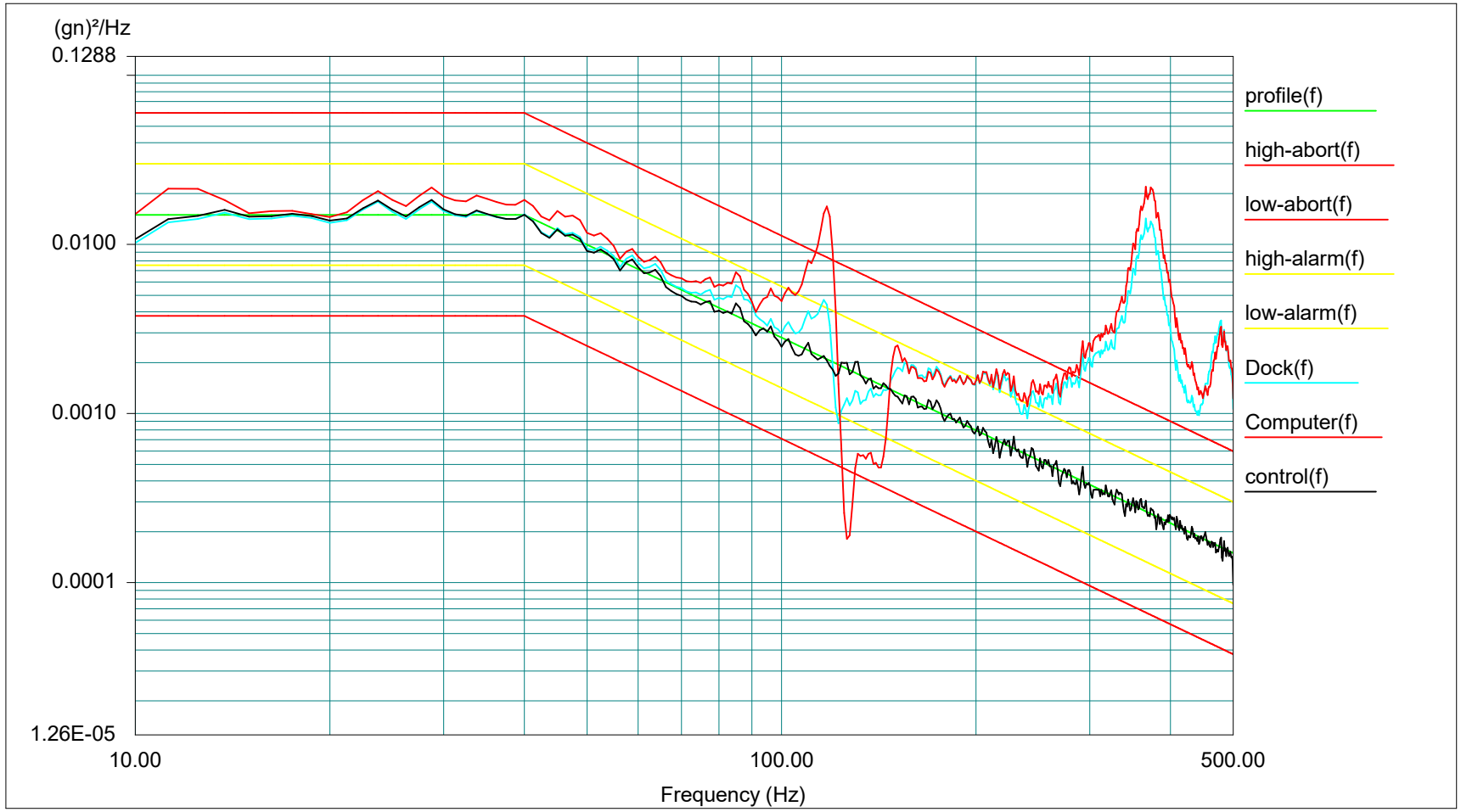
Level: 100 %

Control RMS:	1.045747 gn	Full Level Elapsed Time:	01:00:04	Lines:	400	Frame Time:	0.800000 Seconds
Demand RMS:	1.044836 gn	Remaining Time:	00:00:00	DOF:	154	dF:	1.250000 Hz

Data saved at 09:41:55 AM, Monday, July 13, 2020 Report created at 09:41:59 AM, Monday, July 13, 2020

111297 Samsung XCover Pro Charging Cradle Operational Vibration Vertical Axis

DUT: Samsung Galaxy XCover Pro6 Phone, 111297 Samsung XCover Pro Cradle PVT Sample, 7160-0750, SV1159
Test Protocol: C1 vertical profile, 1 HR, Vertical
Project File Name: C-1 Vertical Profile Vert axis.prj
Profile Name: C-1 Vertical Test Type: Random Run Folder: .\RunFolder Jul 13, 2020 10-56-48



Level: 100 %

Control RMS:	1.042880 gn	Full Level Elapsed Time:	01:00:00	Lines:	400	Frame Time:	0.800000 Seconds
Demand RMS:	1.044836 gn	Remaining Time:	00:00:00	DOF:	154	dF:	1.250000 Hz

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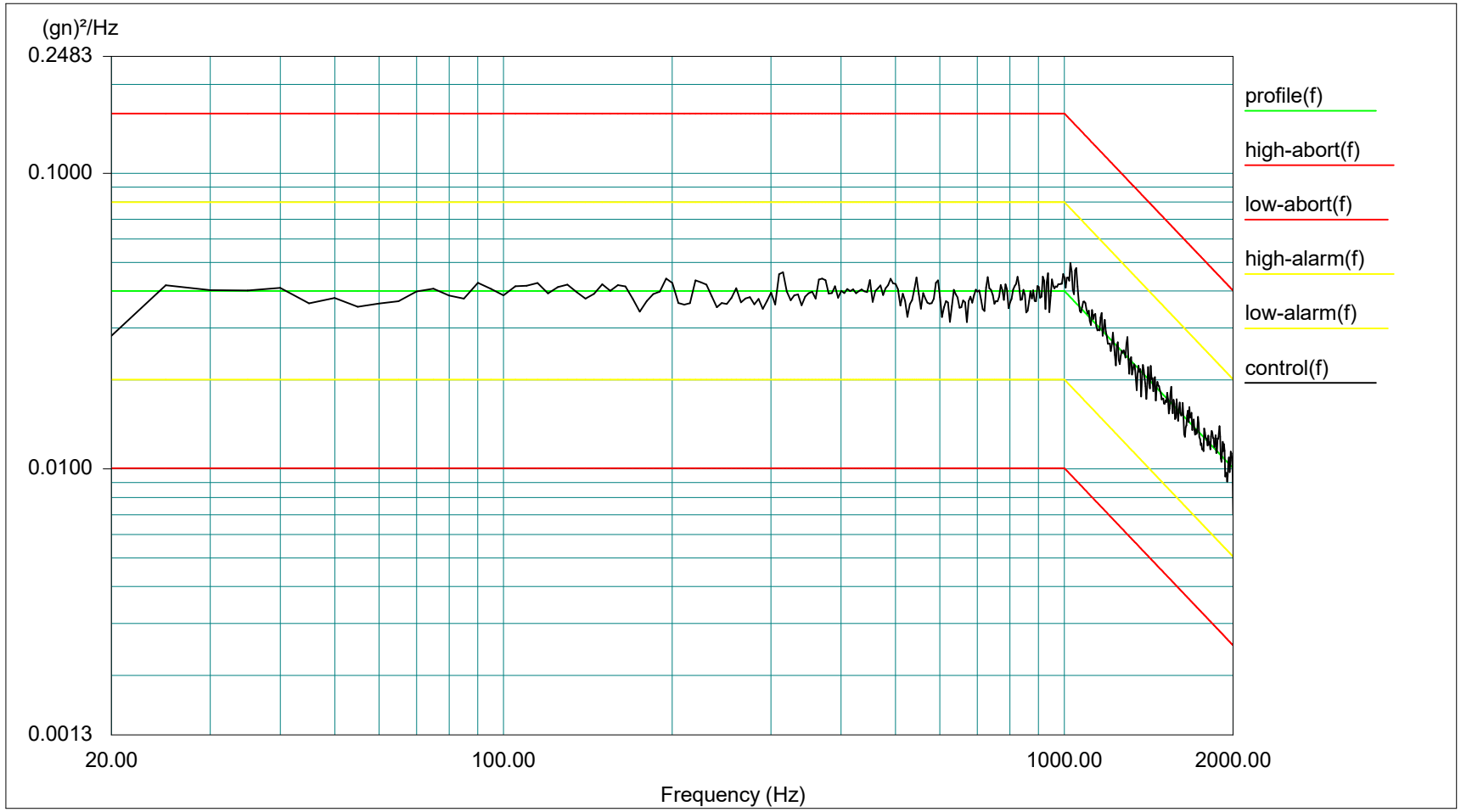
111297 Samsung XCover Pro Charging Cradle Non-Operational Vibration All Axes

DUT: Samsung Galaxy XCover Pro6 Phone, 111297 Samsung XCover Pro Cradle PVT Sample, 7160-0750, SV1159
Test Protocol: MIL-STD-810G E-1, 1 HR, FTB
Project File Name: MIT Non Operational E-1 Long Axis.prj
Profile Name: MIL STD 810G E-1 Profile Test Type: Random Run Folder: .\RunFolder Jul 14, 2020 09-58-50



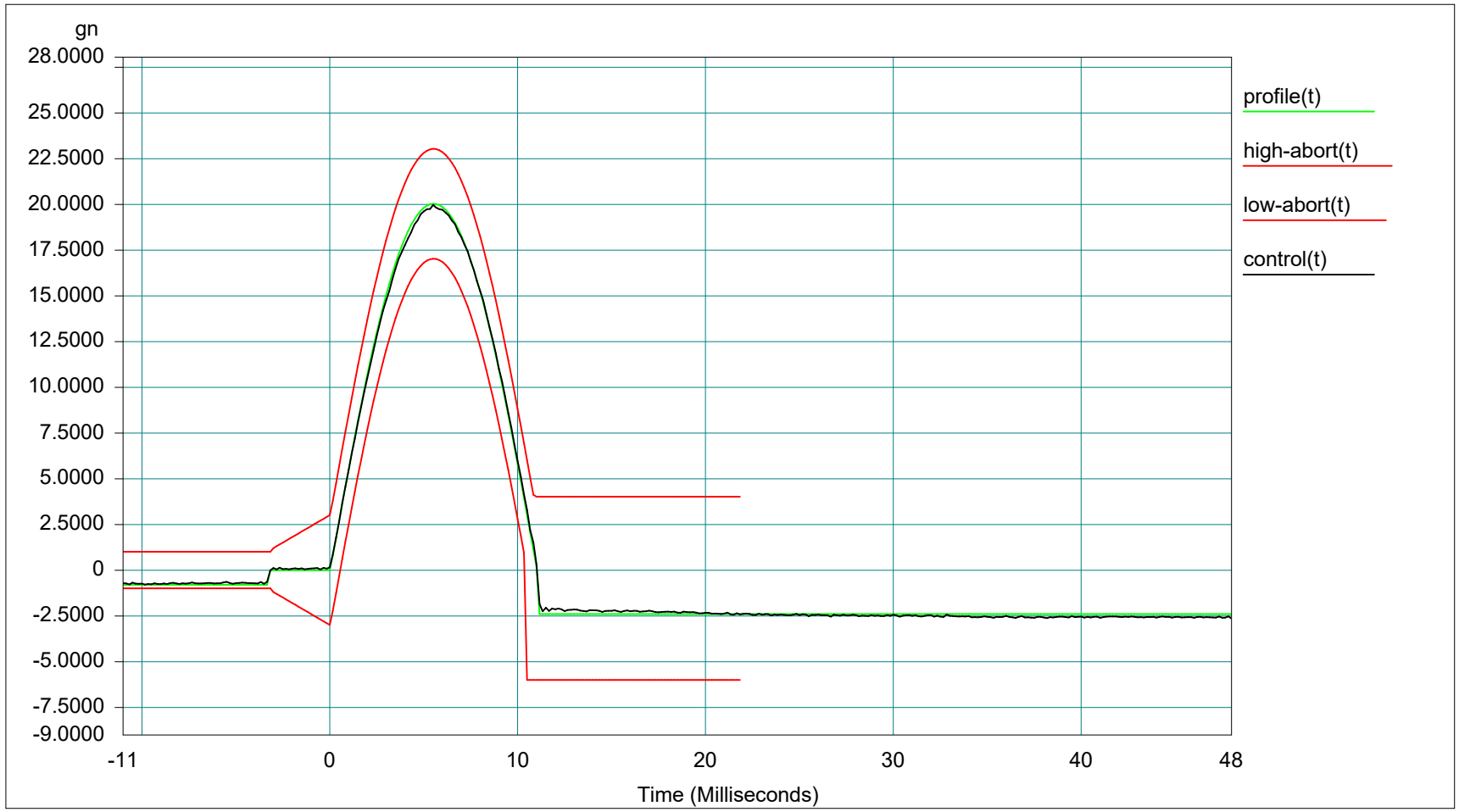
Level: 100 %

Control RMS:	7.678018 gn	Full Level Elapsed Time:	01:00:00	Lines:	400	Frame Time:	0.200000 Seconds
Demand RMS:	7.701191 gn	Remaining Time:	00:00:00	DOF:	154	dF:	5.000000 Hz

Data saved at 10:59:57 AM, Tuesday, July 14, 2020 Report created at 10:59:58 AM, Tuesday, July 14, 2020

111297 Samsung XCover Pro Charging Cradle 20g Shock; Non-Operational All Axes Positive

DUT: Samsung Galaxy XCover Pro6 Phone, 111297 Samsung XCover Pro Cradle PVT Sample, 7160-0750, SV1159
Test Protocol: 20g 11ms Shock, FTB, Positive
Project File Name: 20g 11ms Shock Long axis.prj
Profile Name: 20g 11ms Test Type: Classical Shock Run Folder: .\RunDefault Jul 14, 2020 11-12-24



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Frame Time: 0.682667 Seconds Control Peak: 19.933544 Control RMS: 2.008814 Full Level Elapsed Pulses: 3
dT: 0.000167 Seconds Demand Peak: 20.000000 Demand RMS: 2.007368 Remaining Pulses: 0
Pulse Type: Half Sine Amplitude: 20.000000 Pulse Width: 11.000000 ms
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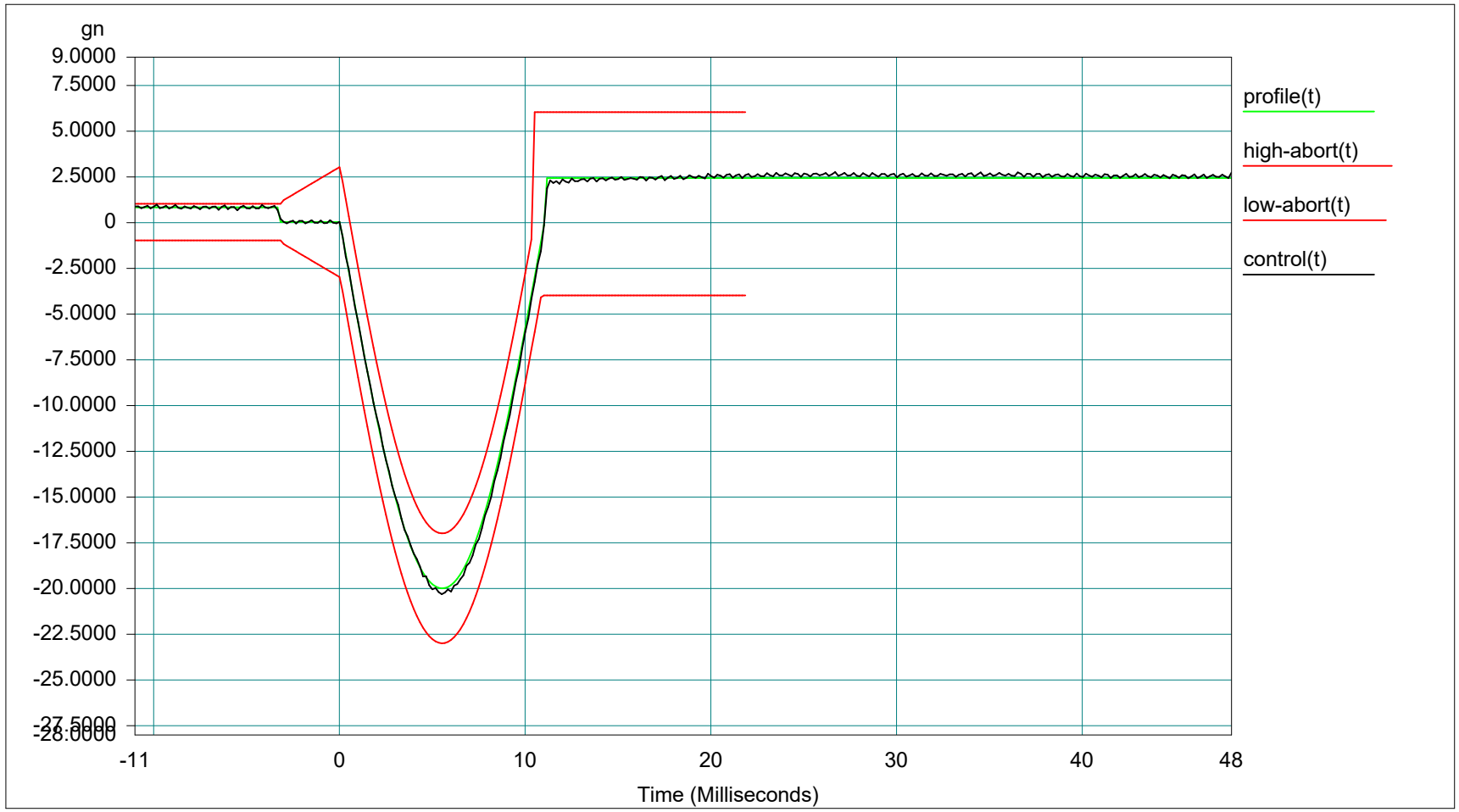
111297 Samsung XCover Pro Charging Cradle 20g Shock; Non-Operational All Axes Negative

DUT: Samsung Galaxy XCover Pro6 Phone, 111297 Samsung XCover Pro Cradle PVT Sample, 7160-0750, SV1159
Test Protocol: 20g 11ms Shock, FTB, Negative
Project File Name: 20g 11ms Shock Long axis.prj
Profile Name: 20g 11ms Test Type: Classical Shock Run Folder: .\RunDefault Jul 14, 2020 11-17-32



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Frame Time: 0.682667 Seconds Control Peak: 20.317886 Control RMS: 2.040299 Full Level Elapsed Pulses: 3
dT: 0.000167 Seconds Demand Peak: 20.000000 Demand RMS: 2.007368 Remaining Pulses: 0
Pulse Type: Half Sine Amplitude: 20.000000 Pulse Width: 11.000000 ms
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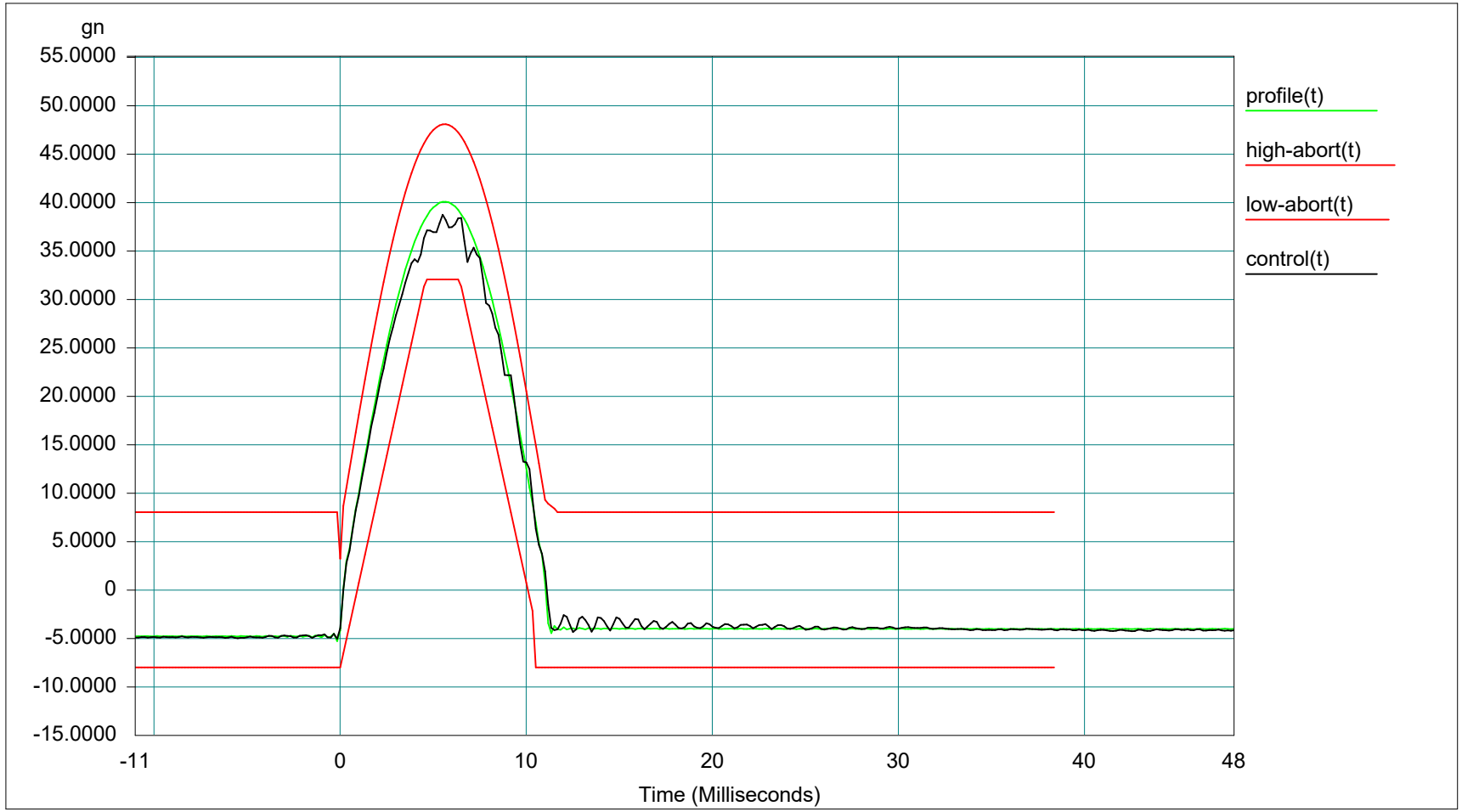
111297 Samsung XCover Pro Charging Cradle 40g Shock; Non-Operational All Axes Positive

DUT: Samsung Galaxy XCover Pro6 Phone, 111297 Samsung XCover Pro Cradle PVT Sample, 7160-0750, SV1159
Test Protocol: 40g 11ms Shock, FTB, Positive
Project File Name: 40g 11ms Shock Long axis.prj
Profile Name: 40g 11ms Test Type: Classical Shock Run Folder: .\RunDefault Jul 14, 2020 12-16-41



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Frame Time: 0.341333 Seconds Control Peak: 38.672234 Control RMS: 5.607409 Full Level Elapsed Pulses: 3
dT: 0.000167 Seconds Demand Peak: 39.999996 Demand RMS: 5.800811 Remaining Pulses: 0
Pulse Type: Half Sine Amplitude: 40.000000 Pulse Width: 11.000000 ms
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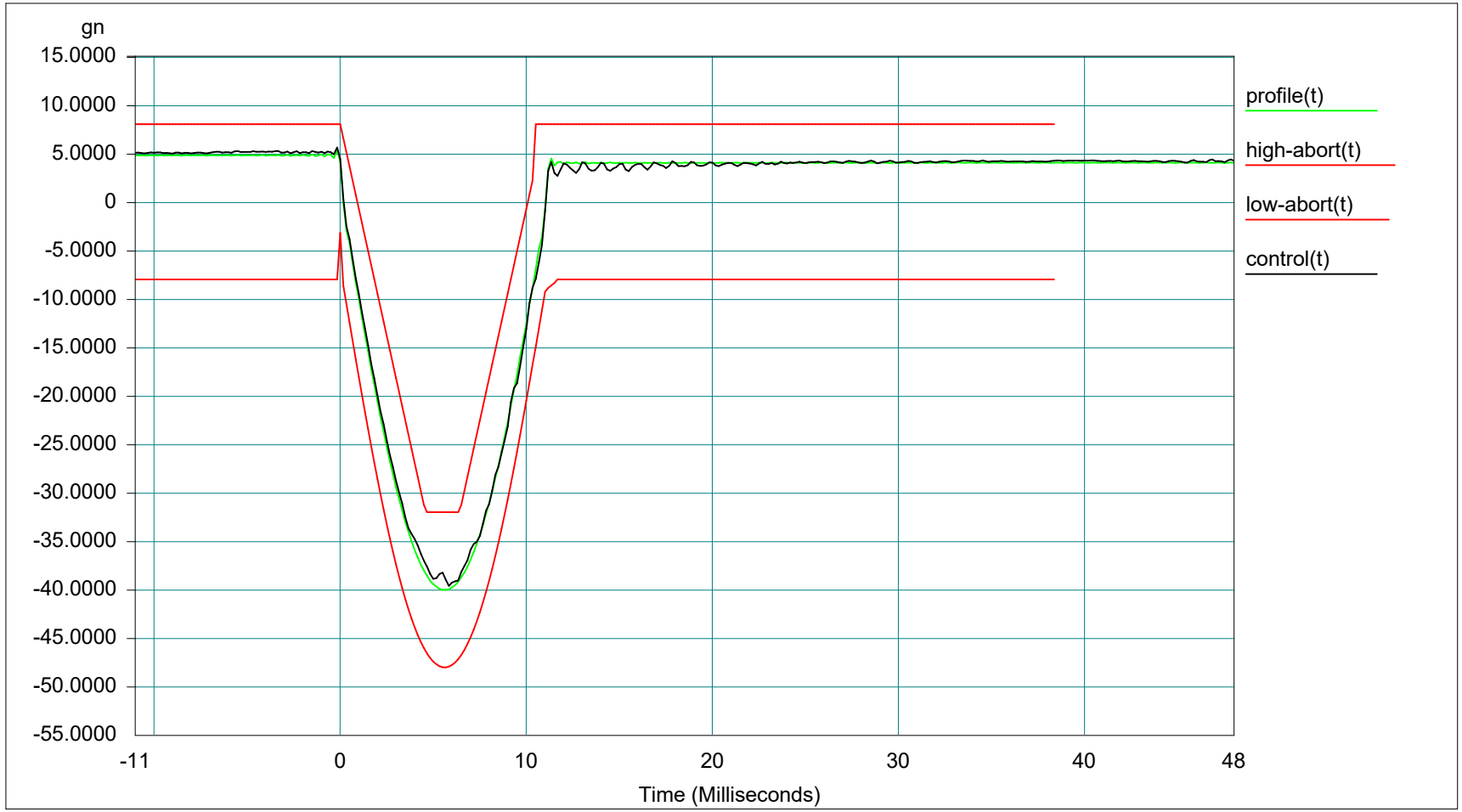
111297 Samsung XCover Pro Charging Cradle 40g Shock; Non-Operational All Axes Negative

DUT: Samsung Galaxy XCover Pro6 Phone, 111297 Samsung XCover Pro Cradle PVT Sample, 7160-0750, SV1159
Test Protocol: 40g 11ms Shock, FTB, Negative
Project File Name: 40g 11ms Shock Long axis.prj
Profile Name: 40g 11ms Test Type: Classical Shock Run Folder: .\RunDefault Jul 14, 2020 12-19-22



Level: 100 % Block Size: 2048 Elapsed Pulses: 17
Frame Time: 0.341333 Seconds Control Peak: 39.585728 Control RMS: 5.735403 Full Level Elapsed Pulses: 3
dT: 0.000167 Seconds Demand Peak: 39.999996 Demand RMS: 5.800811 Remaining Pulses: 0
Pulse Type: Half Sine Amplitude: 40.000000 Pulse Width: 11.000000 ms
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Photographs

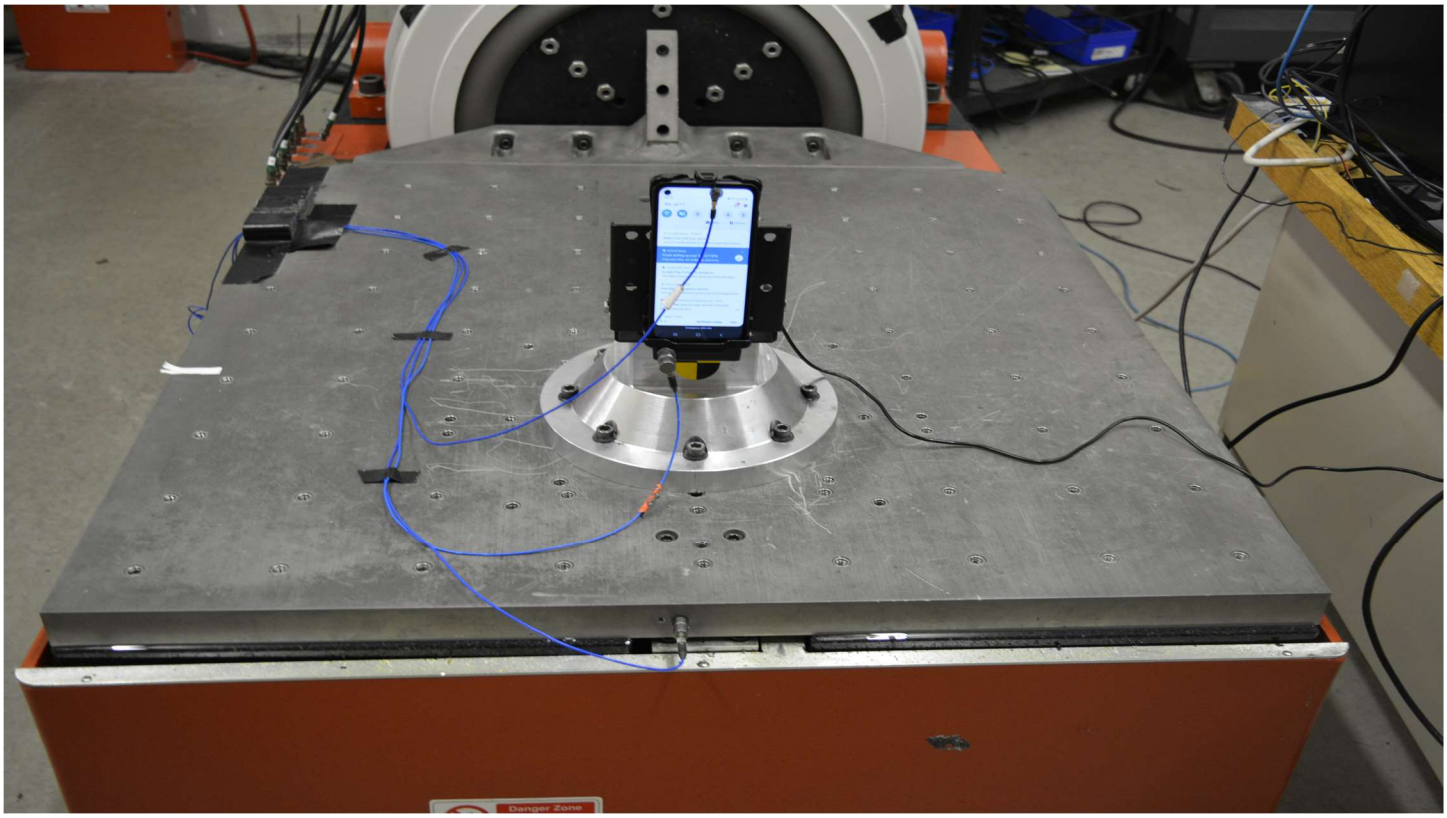

Figure 1: Overall Setup Operational Vibration Longitudinal Axis

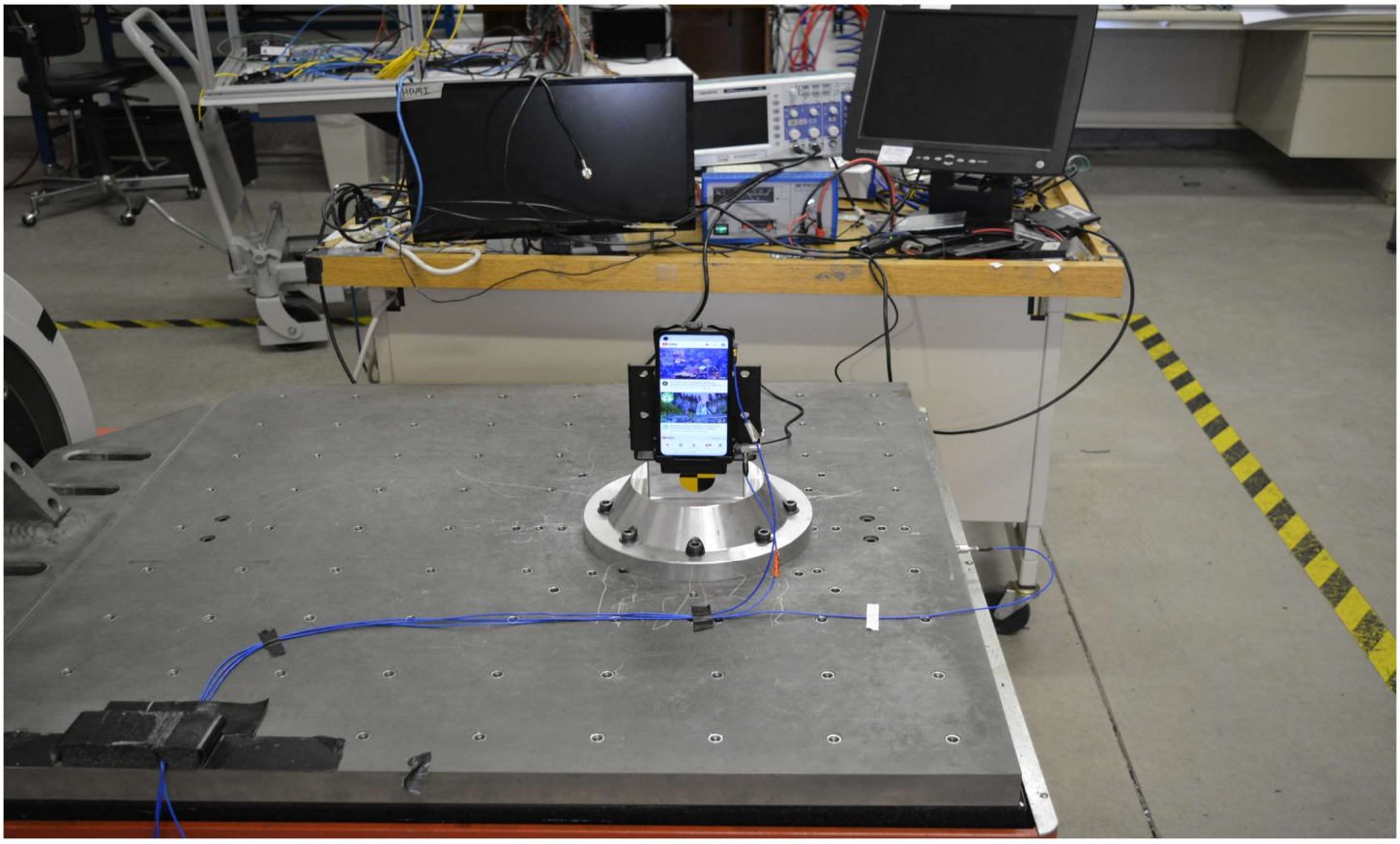

Figure 2: Overall Setup Operational Vibration Transverse Axis

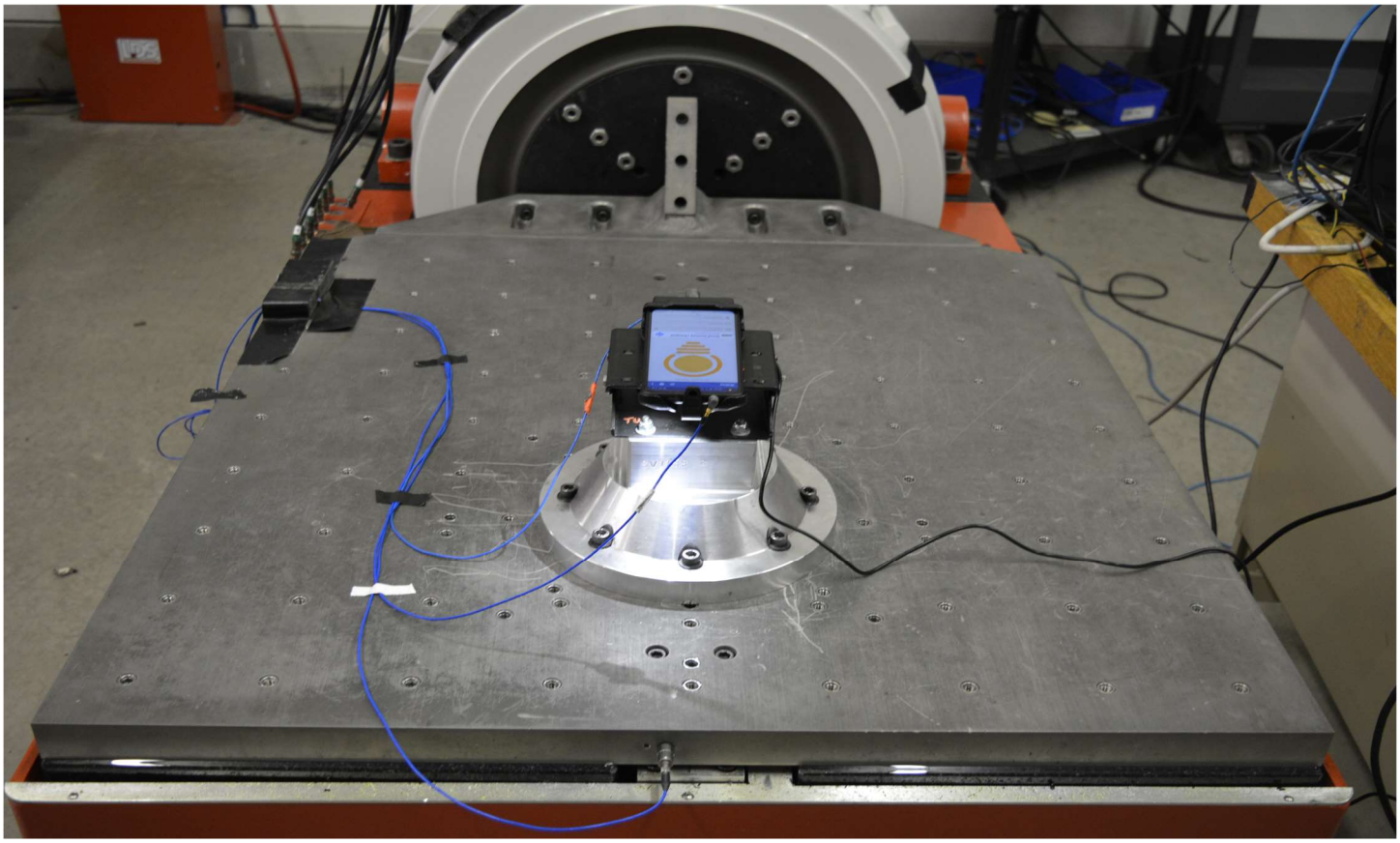

Figure 3: Overall Setup Operational Vibration Vertical Axis

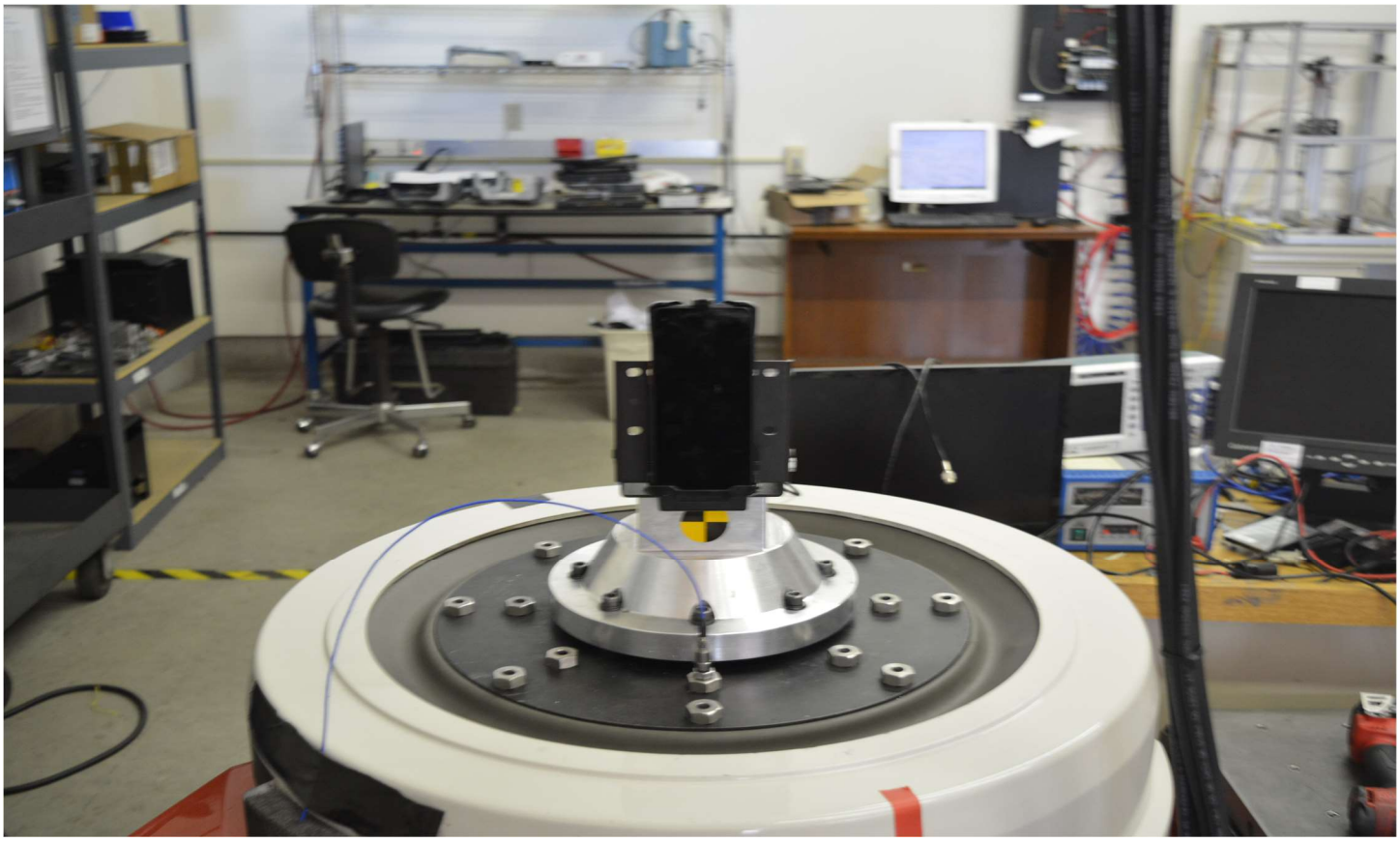

Figure 4: Overall Setup Non-Operational Vibration Vertical Axis

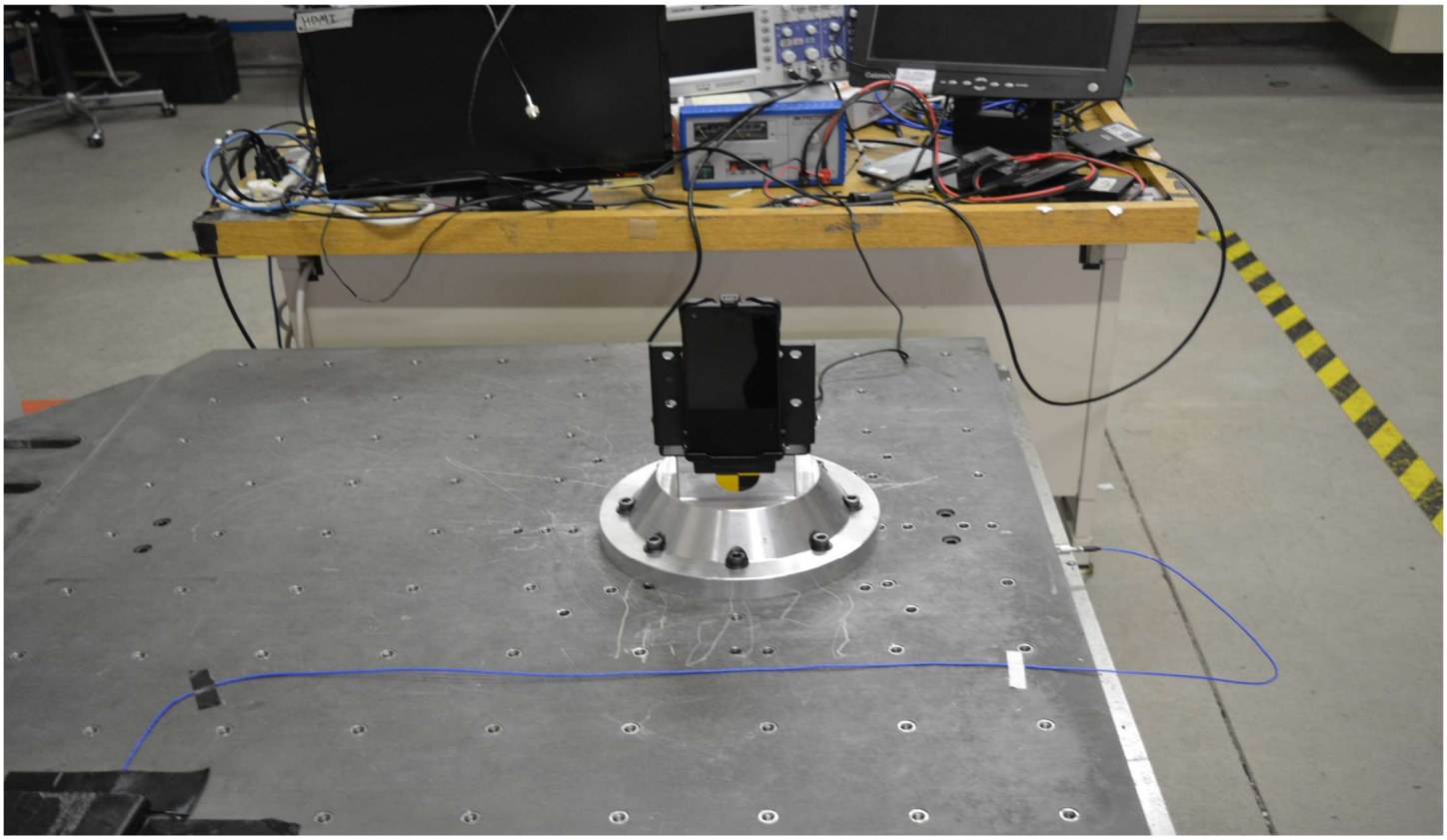

Figure 5: Overall Setup Non-Operational Vibration Transverse Axis

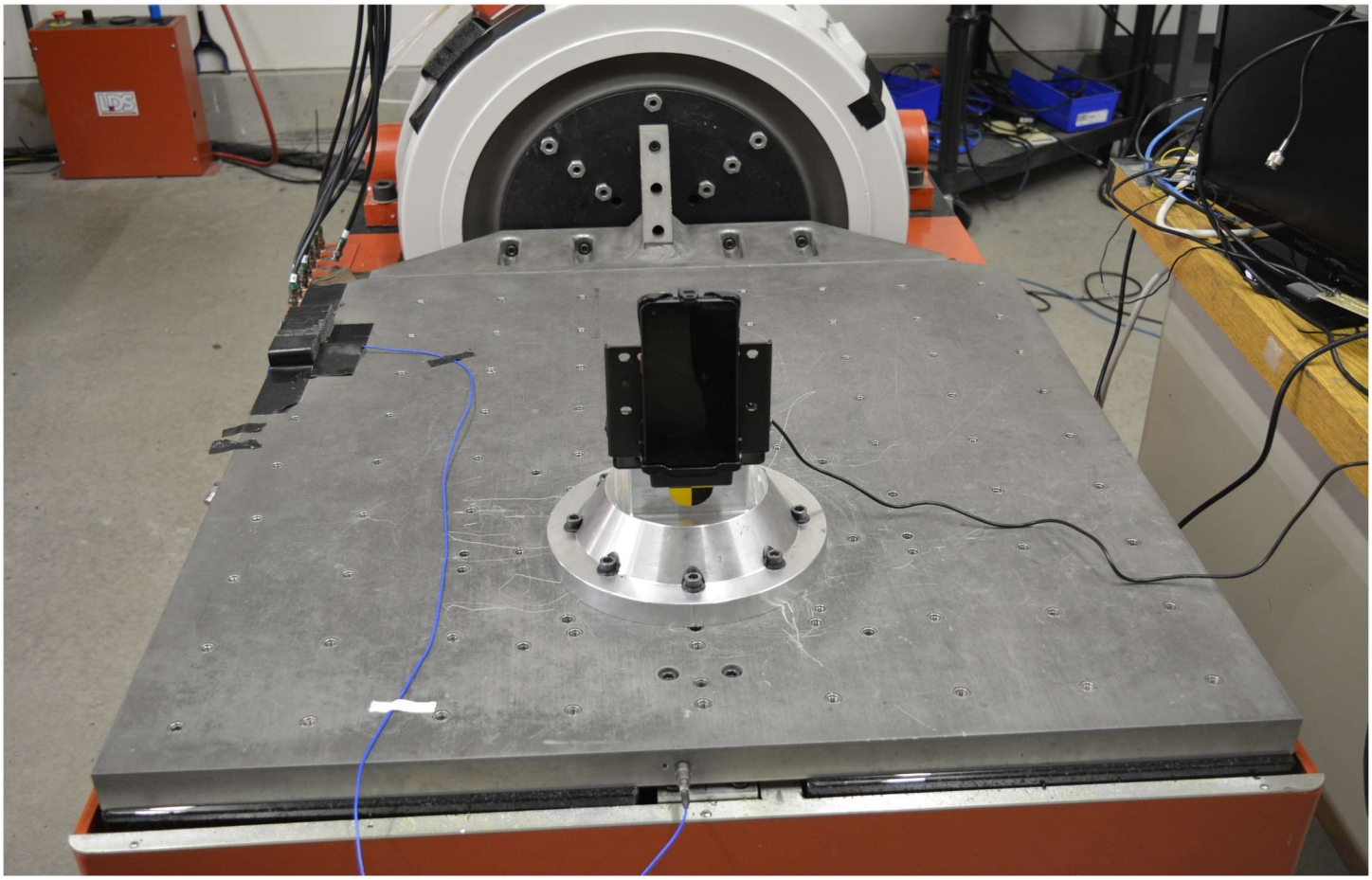

Figure 6: Overall Setup Non-Operational Vibration Longitudinal Axis

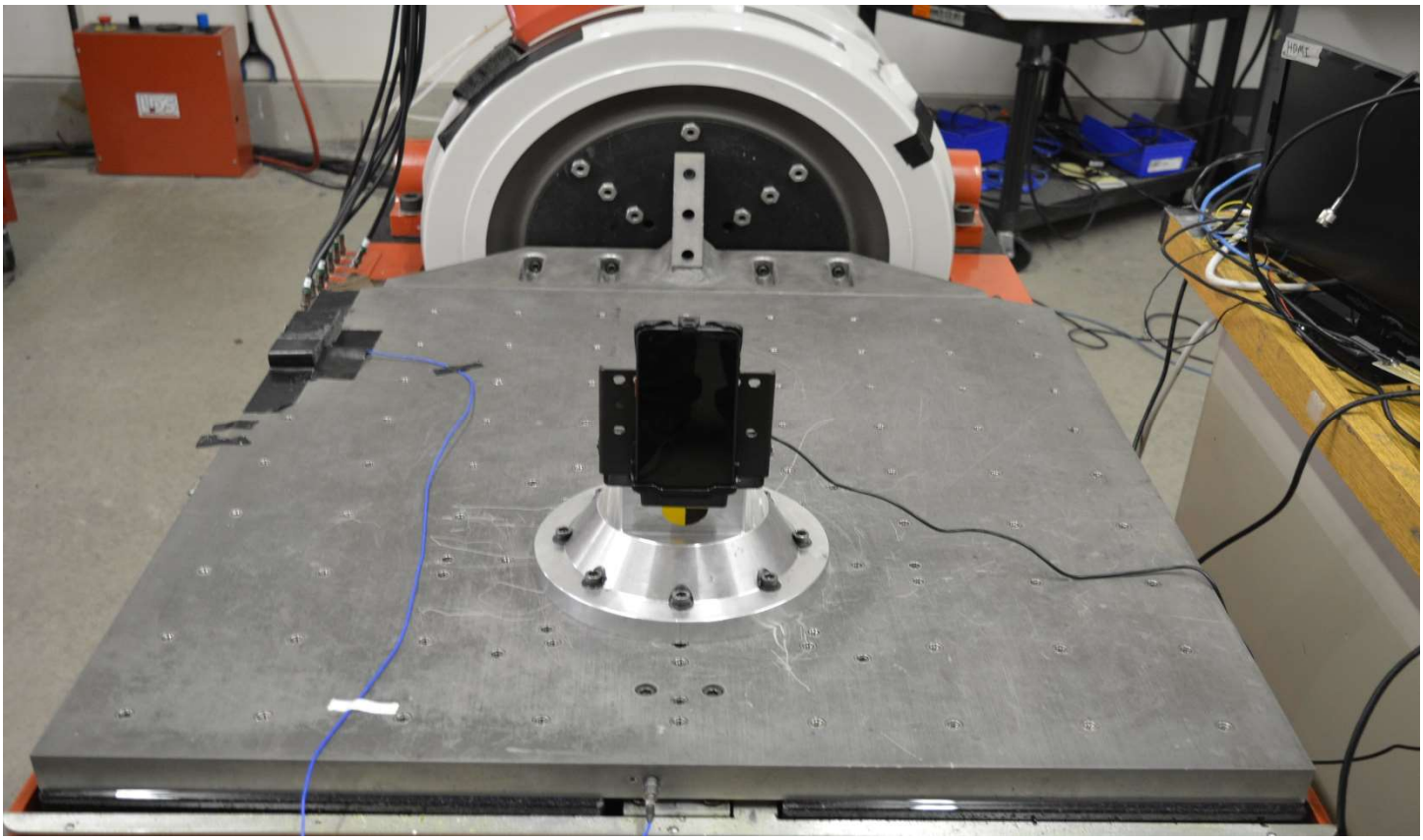

Figure 7: Overall Setup 20g; Shock Non-Operational Longitudinal Axis

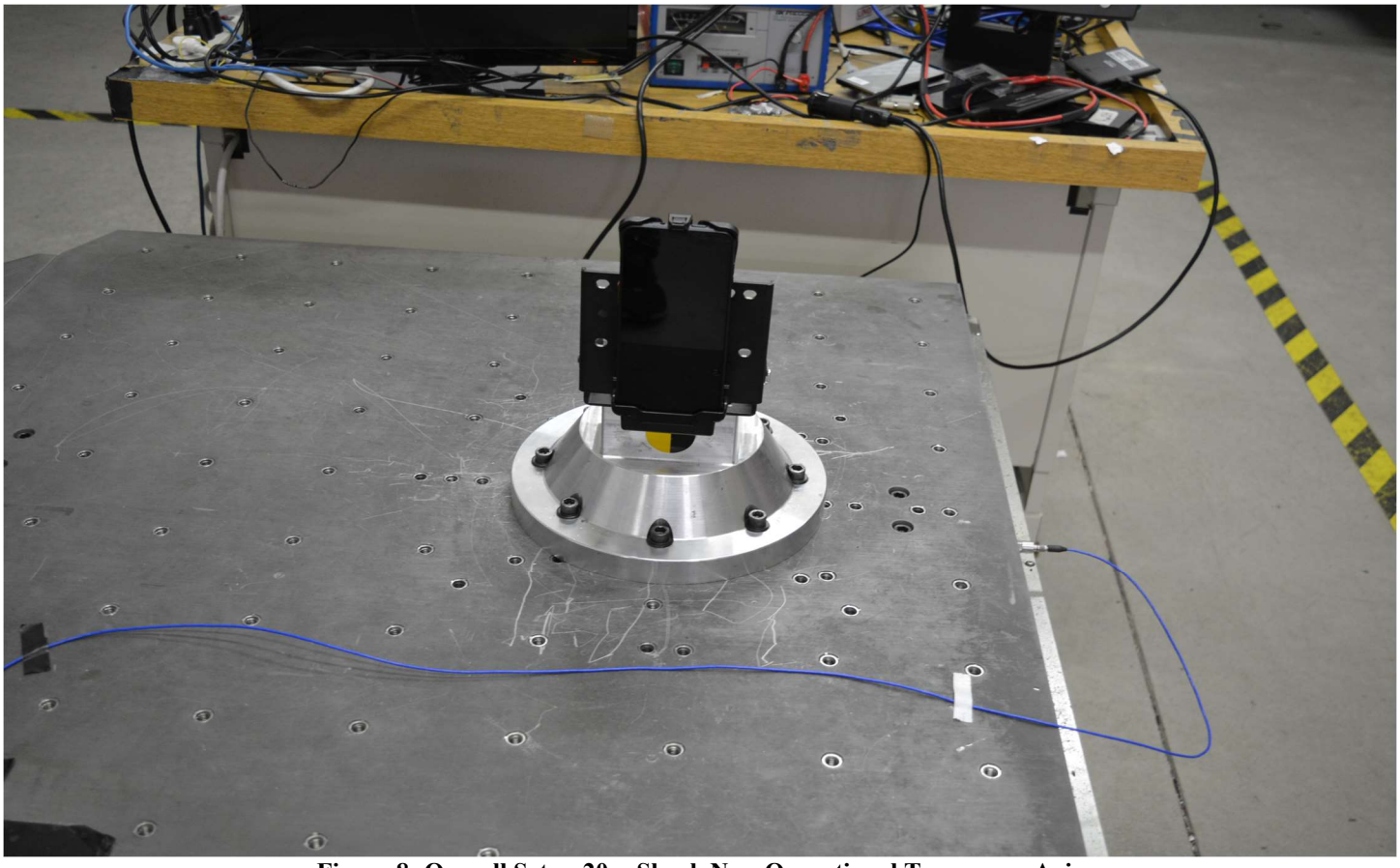

Figure 8: Overall Setup 20g; Shock Non-Operational Transverse Axis

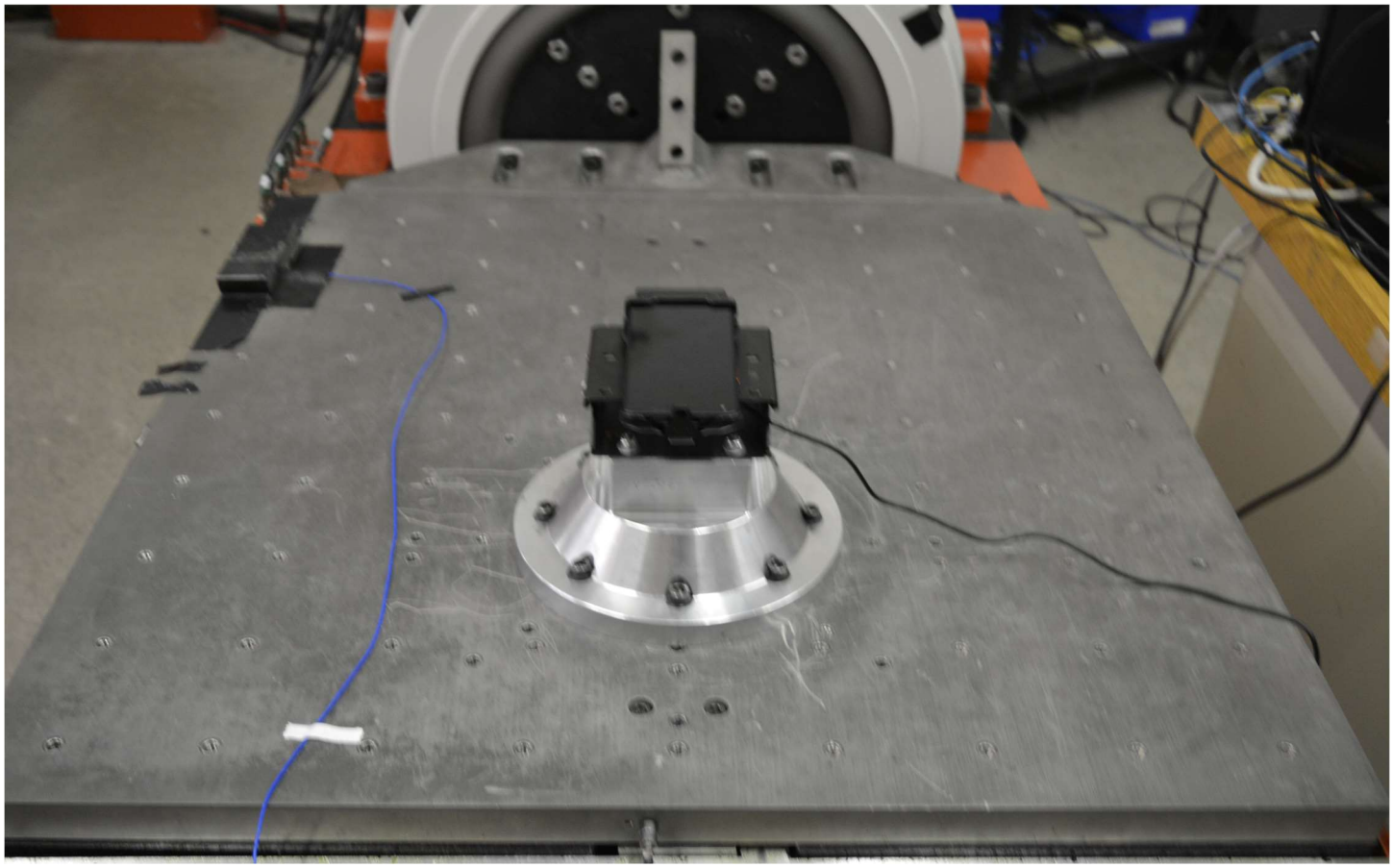

Figure 9: Overall Setup 20g; Shock Non-Operational Vertical Axis

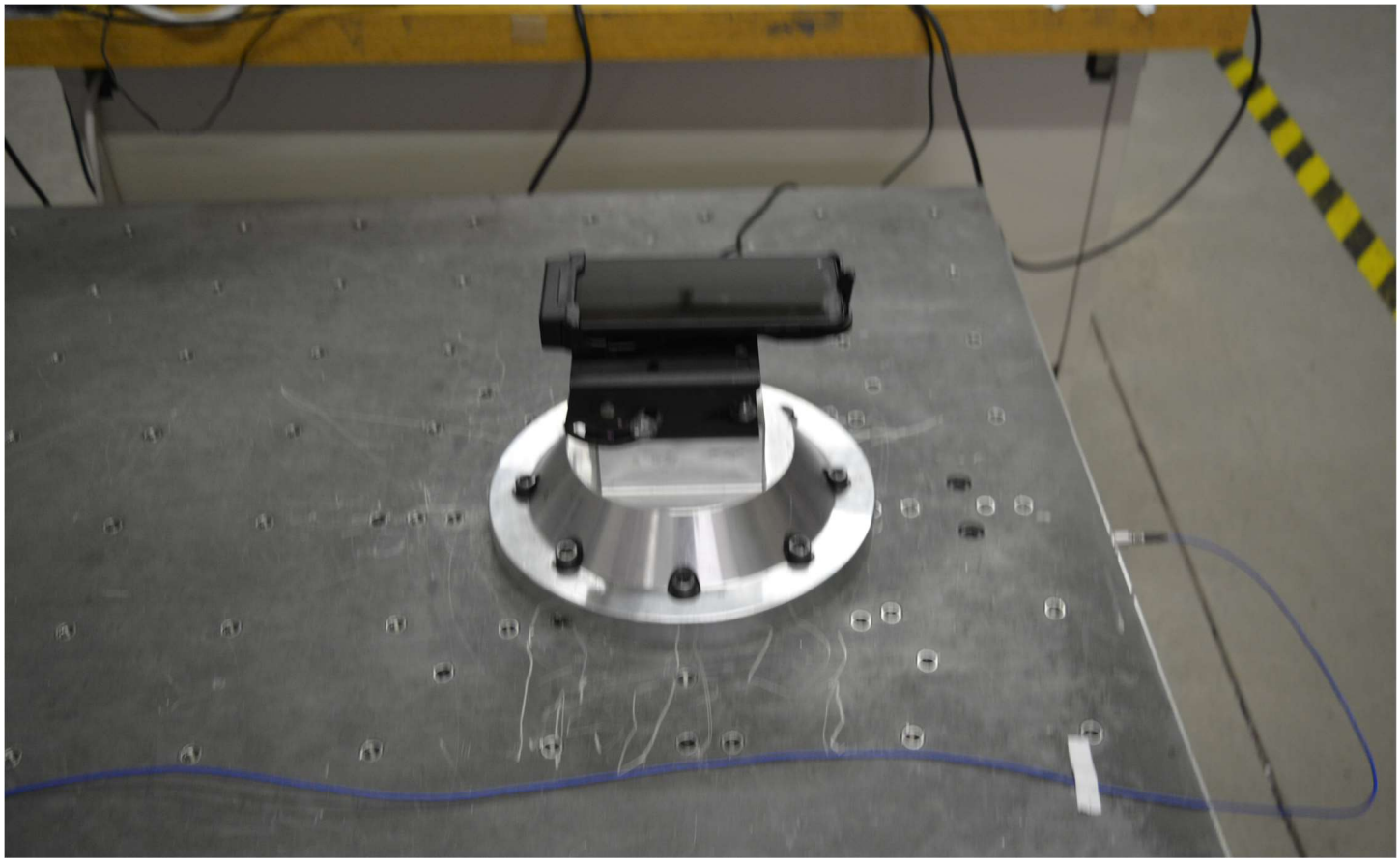

Figure 10: Overall Setup 40g; Shock Non-Operational Vertical Axis

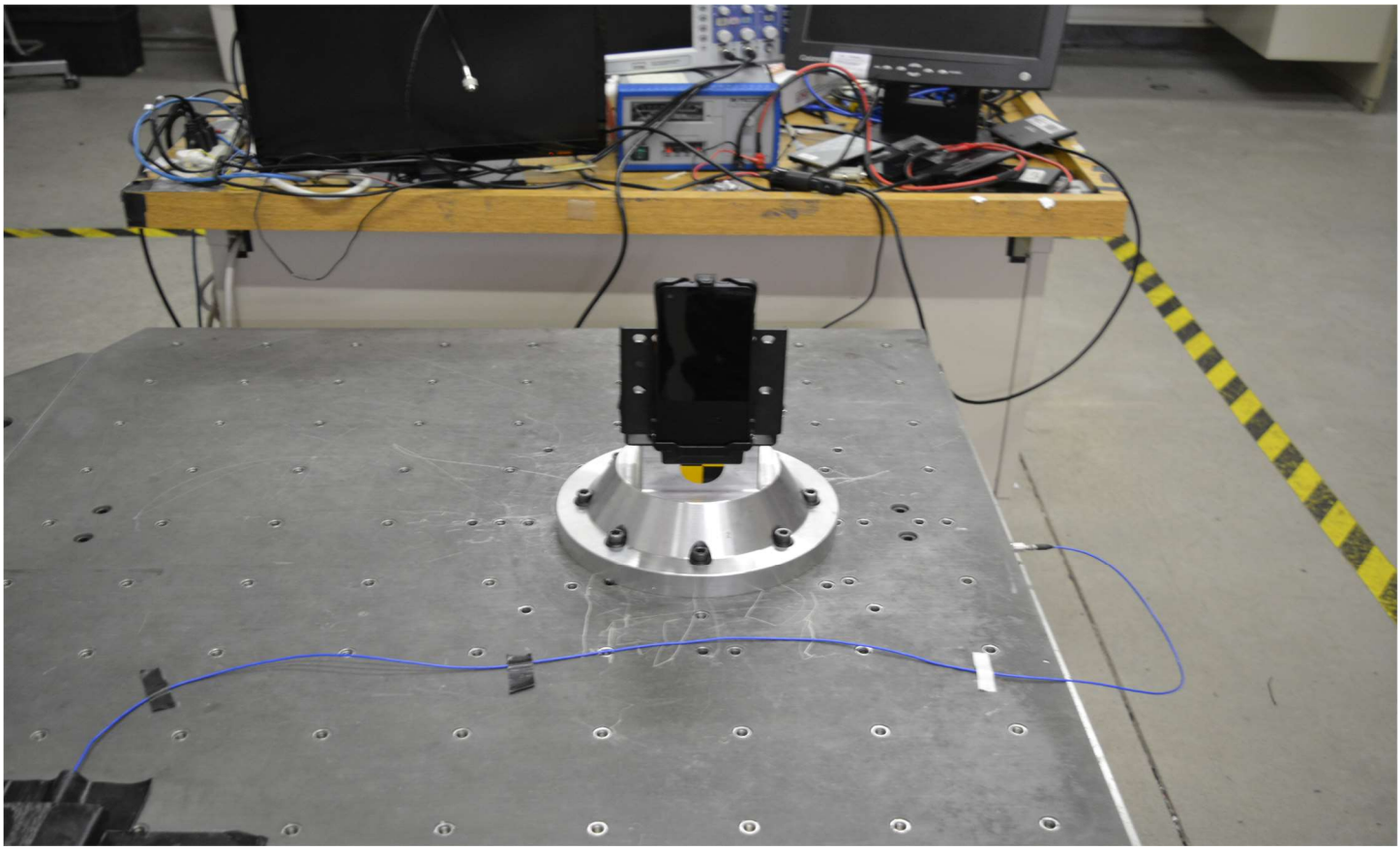

Figure 11: Overall Setup 40g; Shock Non-Operational Transverse Axis

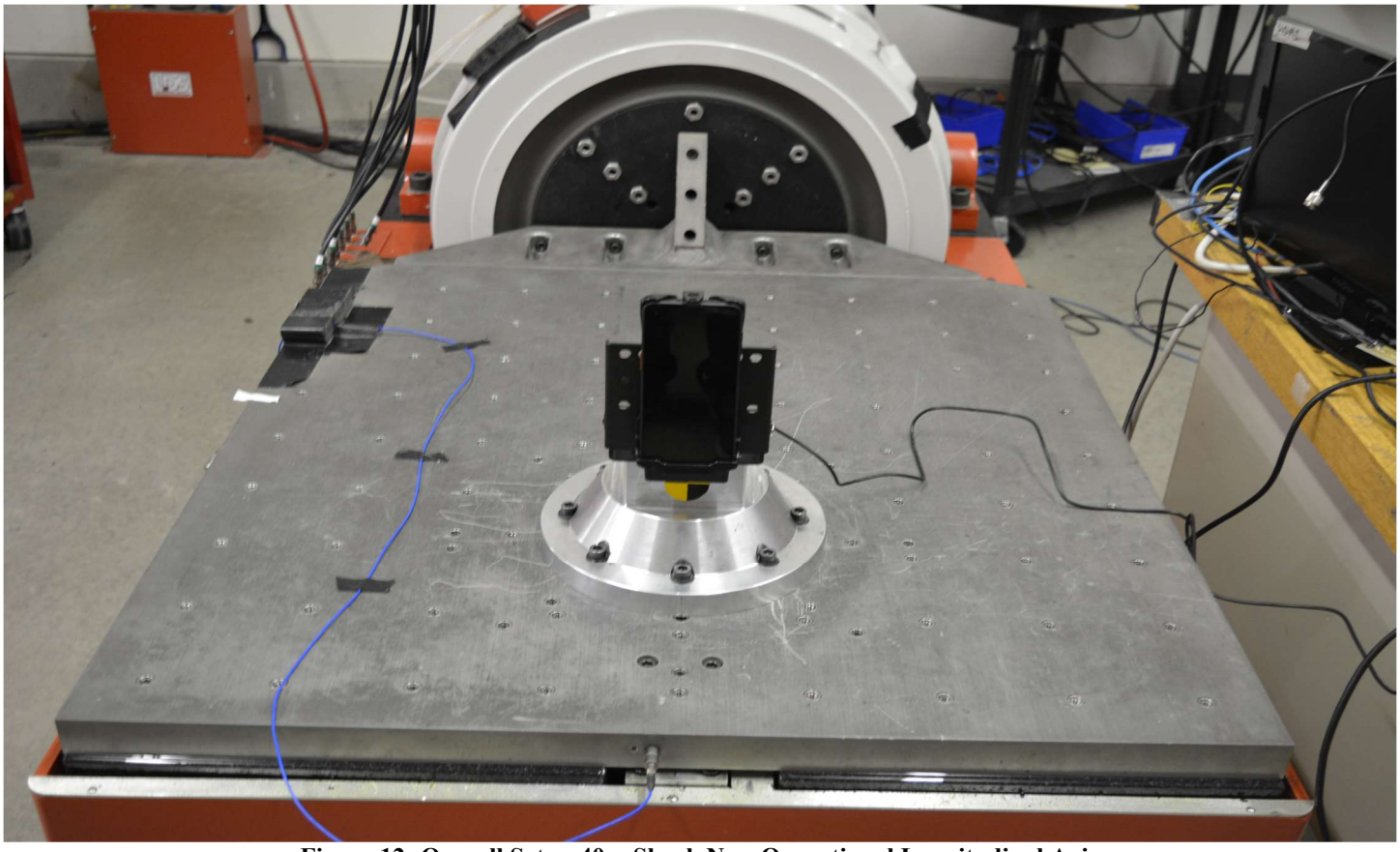

Figure 12: Overall Setup 40g; Shock Non-Operational Longitudinal Axis

Test Notes

Shock and Vibration Test Notes

Project:
111297 Samsung X Cover Pro Charging Cradle PVT Testing 7-10-20

Sheet 1 of 3

Date	Time	By	Total Elapsed	Total Remain	Comments
					Computer #1:
					Predest Evaluation
					* Phone is a good fit in the cradle
					* no issues or concerns
					Operational Vibration
					-configuration: Samsung Galaxy X cover Pro Phone - computer #1
					GS 111297 X cover Pro charging Cradle - Production
					Quality Sample
					7160-0750 / SU 1159-2
					-profile: GS Revised Spec
					(1) hour per axis (3) hours total
					514.6 C-1 MIL-STD 810G
					-monitoring: Power, ~~Ex~~ battery charging
					→ Longitudinal Axis ←
3:38pm	MC				Start Test Gain: 15% Temp: 71°F
					* battery at 5% at start of test
			1HR		End Test
					* battery at 37% at end of test
					* no issues or concerns
					→ Transverse Axis ←
7/13/20	MC		1HR		Start Test Gain: 15% Temp: 73°F
					* ~~Battery~~ at 39%
					End Test
					* Battery at 63%
					* No issues or concerns
					→ Vertical Axis ←
10:	MC				Start Test Gain: 15% Temp: 74°F
					* Battery at 45%
			1HR		End Test
					* Battery at 73%
					* no issues or concerns

Shock and Vibration Test Notes

Project:

Sheet 2 of 3

Date	Time	By	Total Elapsed	Total Remain	Comments
					Non-operational Vibration
					-Configuration: same as previous test
					-profile: GS Provided Spec (1) hour per axis, (3) hours ~~total~~ MIL-STD 810 G E-1
					→ Vertical Axis ←
	5:34pm	MC	1HR		Start Test Gain: 45% Temp: 80°F End Test
					* No visible dust, wear or pin wear
					* no issues or concerns
					→ Transverse Axis ←
7/15/20	8:50 AM	MF	1HR		Start Test Gain: 65% Temp: 73°F End Test
					* No issues or concerns
					→ Longitudinal Axis ←
	9:55 AM	MF	1HR		Start Test Gain: 65% Temp: 73°F End Test
					* no visible wear or dust or pin wear
					* cradle and phone confirmed functional
					* no issues or concerns
					20 g Shock; Non-operational
					- configuration: same as previous test
					- profile: 3 GS Provided Spec (6 pulses per axis, (3) positive and (3) negative, (18) total)
					20 g, 11ms, half-sine
					→ Longitudinal Axis ←
	11:12am	MC			start test Gain: 65% Temp: 74°F
					positive: III → N/A
					negative: III → N/A
					* no issues or concerns

Shock and Vibration Test Notes

Project:

Sheet 3 of 3

Date	Time	By	Total Elapsed	Total Remain	Comments
					→ Transverse Axis ←
	11:27am	MC			Start Test Gain: 66% Temp: 74°F
					positive: ||| → N/A
					negative: ||| → N/A
					→ Vertical Axis ←
	11:43am	MC			Start Test Gain: 65% Temp: 74°F
					positive: ||| → N/A
					negative: ||| → N/A
					40g Shock; Non-operational
					- Configuration: Same as previous test
					- Profile: 65 Pounded Spec
					(6) pulses per axis, (3) positive and (3) negative; (18) total
					40g, 11ms, half-sine
					→ Vertical Axis ←
	11:58am	MC			~~positive~~ Start Test Gain: 100% Temp: 73°F
					positive: ||| → no projectiles
					negative: ||| → no projectiles
					→ Transverse Axis ←
					Start Test Gain: 100% Temp: 74°F
					positive: ||| → no projectiles
					negative: ||| → no projectiles
					→ Longitudinal Axis ←
		MC			Start Test Gain: 100% Temp: 74°F
					positive: ||| → no projectiles
					negative: ||| → no projectiles
					* Cradle and phone confirmed functional
					* no issues or concerns