

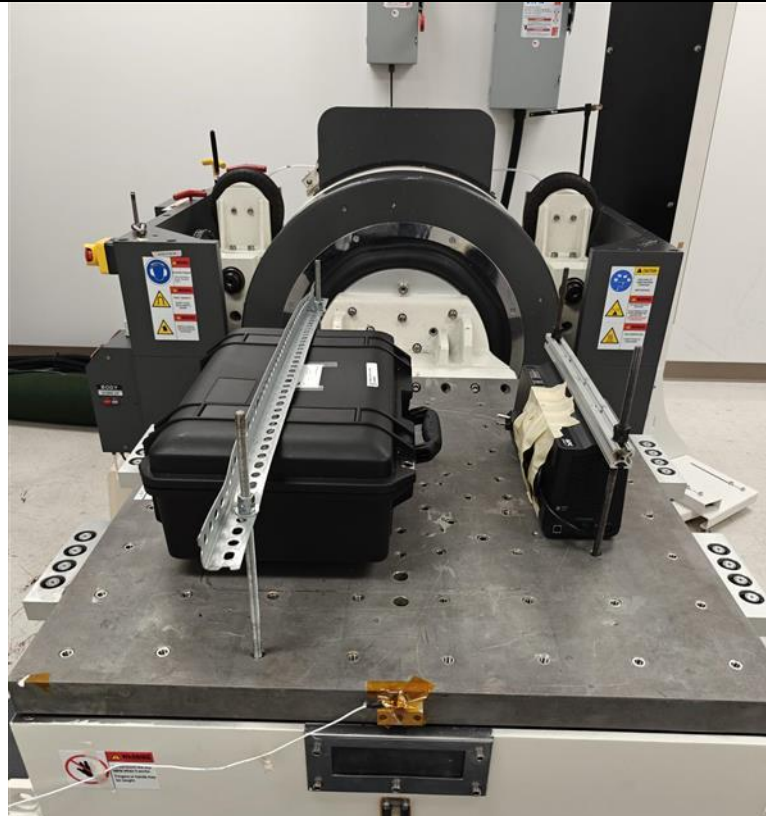


| ENV SUMMARY TEST REPORT  |   |
|--|---|
| <b>Report Number..... :</b>  | REP061410-ENV   |
| <b>Date of issue..... :</b>  | October 7, 2024   |
| <b>Total number of pages .....</b>   | 38  |
| <b>Name of Testing Laboratory preparing the Report .....</b>   | Nemko USA, Inc.<br>2210 Faraday Ave., Suite 150, Carlsbad, CA 92008 USA |
| <b>Applicant's name .....</b>  | Novo Engineering  |
| <b>Address..... :</b>  | 1350 Specialty Drive, Suite A, Vista, California, 92081, United States  |
| <b>Test specification:</b>   |   |
| <b>Standard .....</b>  | MIL-STD-810H  |
| <b>Test procedure .....</b>  | Test Report   |
| <b>Non-standard test method .....</b>  | N/A   |
| <b>TRF template used..... :</b>  | IECEE OD-2020-F1:2020, Ed.1.3   |
| <b>Master TRF .....</b>  | 2023-08-24  |
| <b>General disclaimer:</b>   |   |
| <p>The test results presented in this report relate only to the object tested.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.</p> |   |

|   |                            |  |
|---|----------------------------|--|
| <b>Trade Mark(s)</b> .....  | N/A                        |  |
| <b>Manufacturer</b> .....   | Novo Engineering           |  |
| <b>Model/Type reference</b> .....   | VxScan V3.1, VxScan V4.0   |  |
| <b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b> |                            |  |
| <input checked="" type="checkbox"/>   | <b>Testing Laboratory:</b> | Nemko USA Inc. (San Diego)                           |
| <b>Testing location/ address</b> .....  |                            | 2210 Faraday Ave. Suite 150, Carlsbad, CA 92008, USA |
| <b>Tested by (name, function, signature)</b> .....  |                            | Justin Costa<br>(Project Handler)                    |
| <b>Approved by (name, function, signature)</b> ...  |                            | Jose Elias<br>(Verificator)                          |

|   |   |
|---|---|
| <b>Summary of testing:</b>  |   |
| <b>Tests performed (name of test and test clause):</b><br>Method 514.8C-2 – Category 4: Common carrier Longitudinal<br>Method 514.8C-2 – Category 4: Common carrier Vertical  | <b>Testing location:</b><br>Nemko USA Inc.(San Diego)<br>2210 Faraday Ave. Suite 150, Carlsbad, CA 92008, USA |
| <b>Statement concerning the uncertainty of the measurement systems used for the tests</b><br><input type="checkbox"/> Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:<br><b>Procedure number, issue date and title:</b><br>Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.<br><input checked="" type="checkbox"/> Statement not required by the standard used for type testing |   |

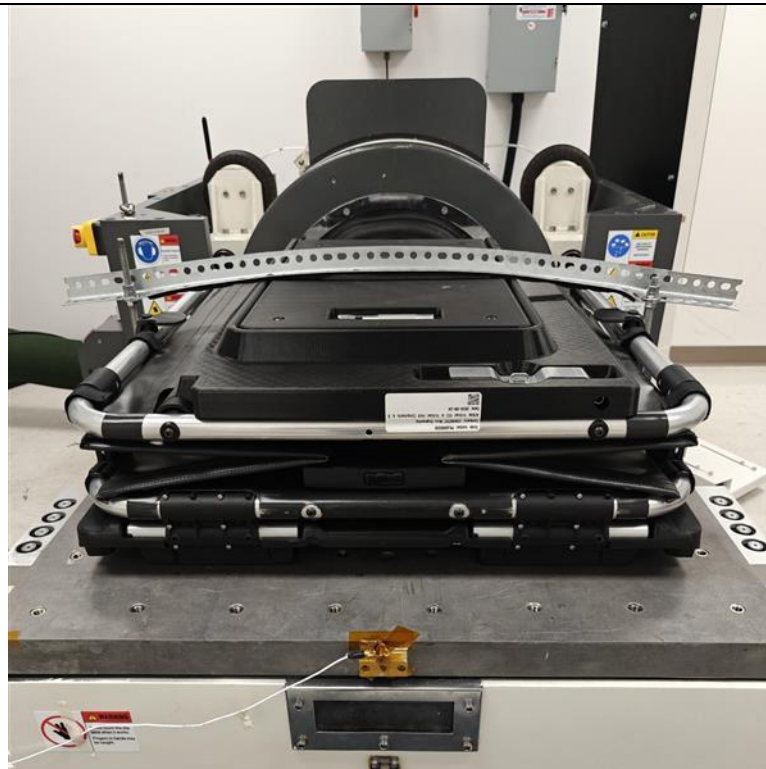
## Testing Setups

**X-Axis (Longitudinal)****Setup****Run 1**

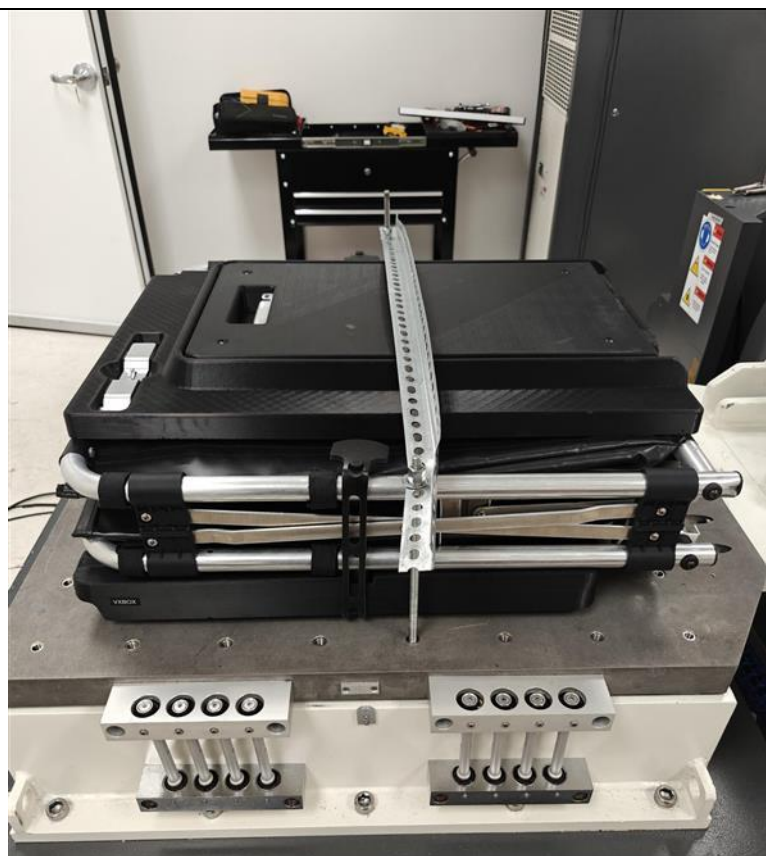
## Testing Setups



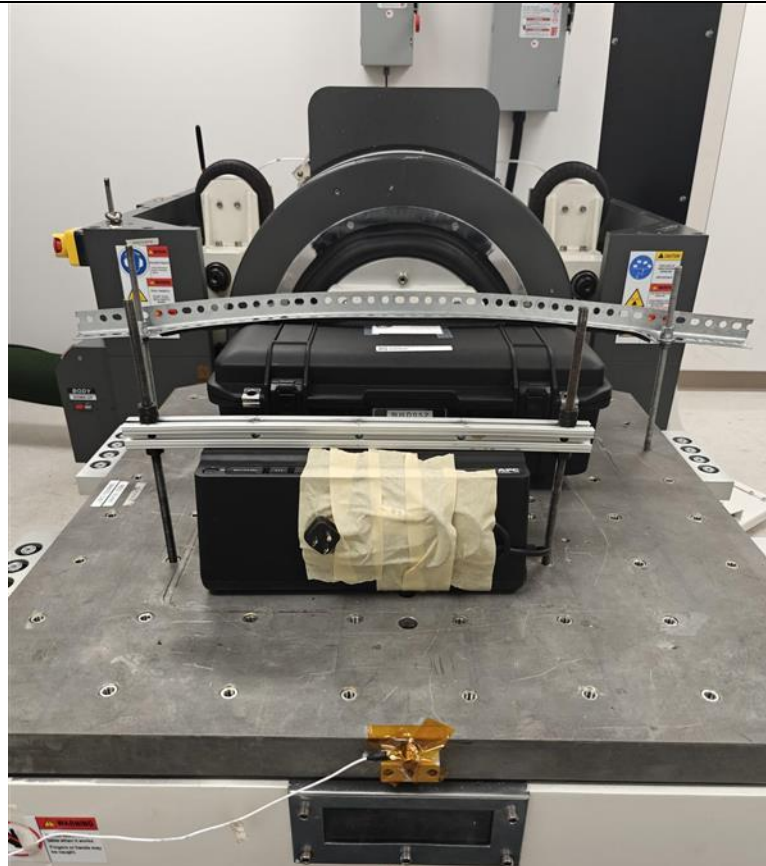
Run 2



Testing Setups

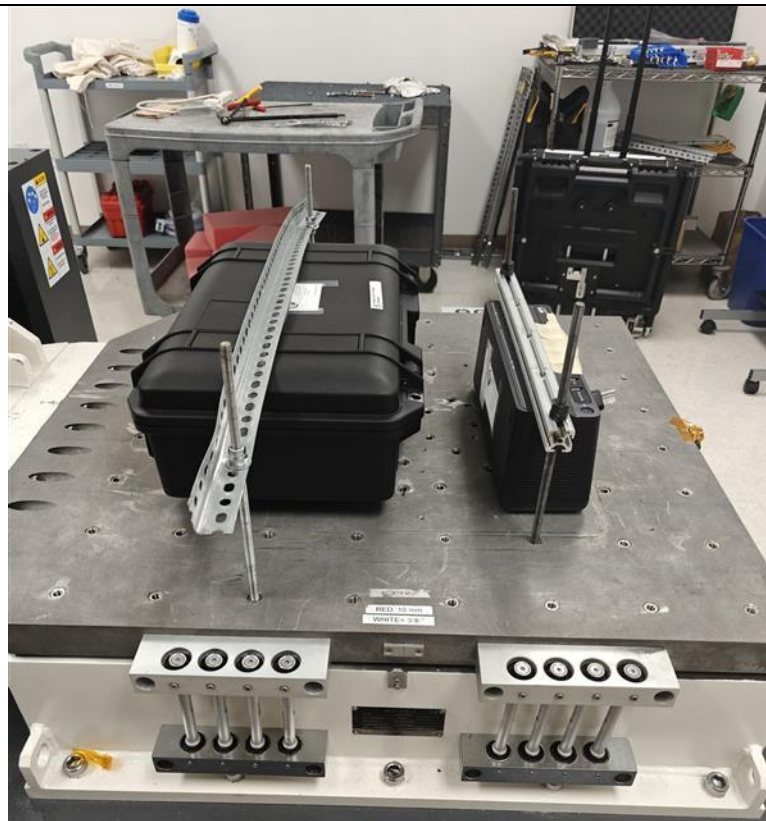


## Testing Setups

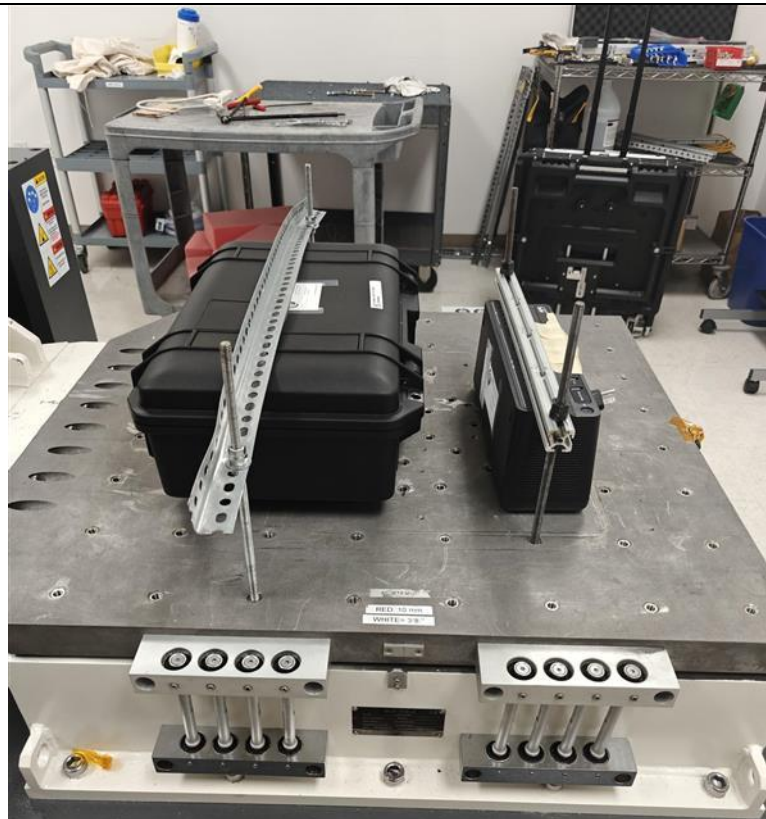
**Y-Axis (Longitudinal)****Setup****Run 1**



## Testing Setups



Run 2



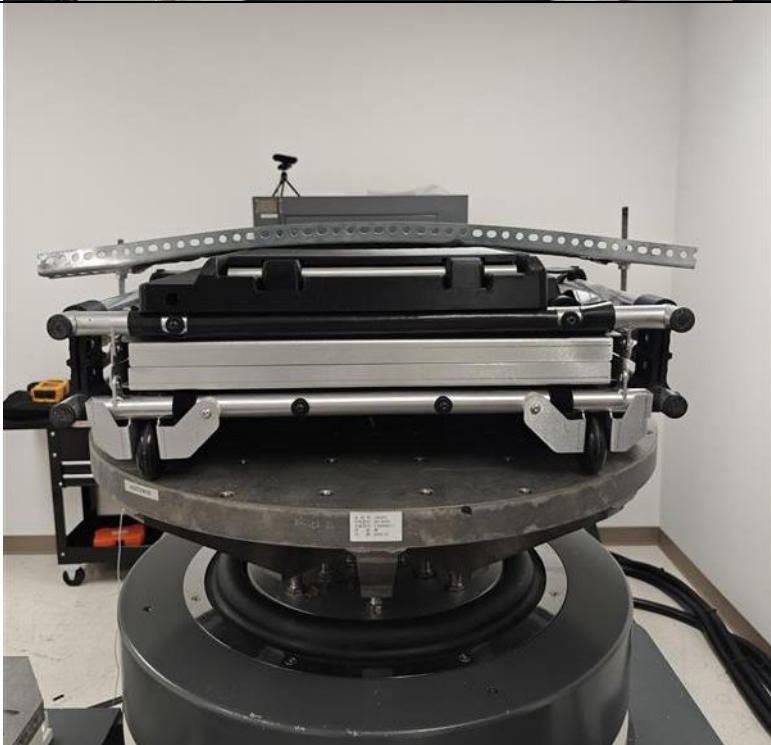
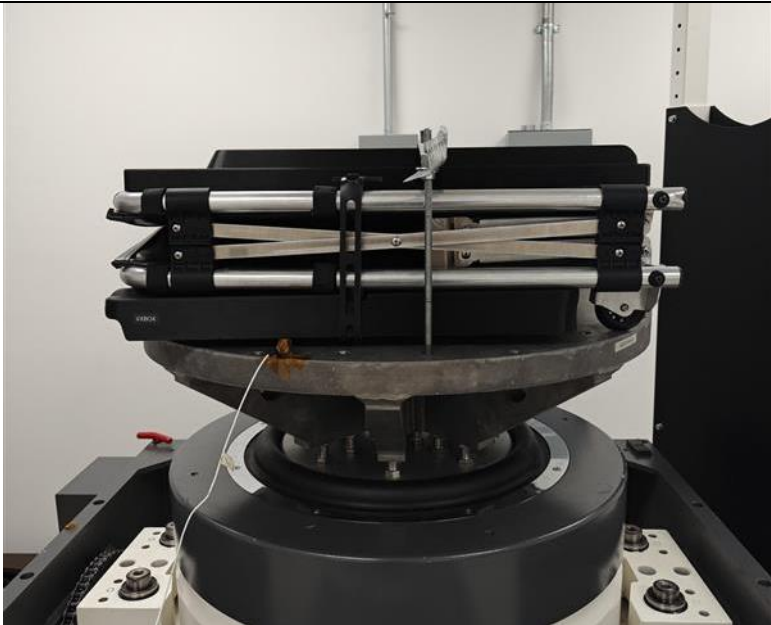


Testing Setups



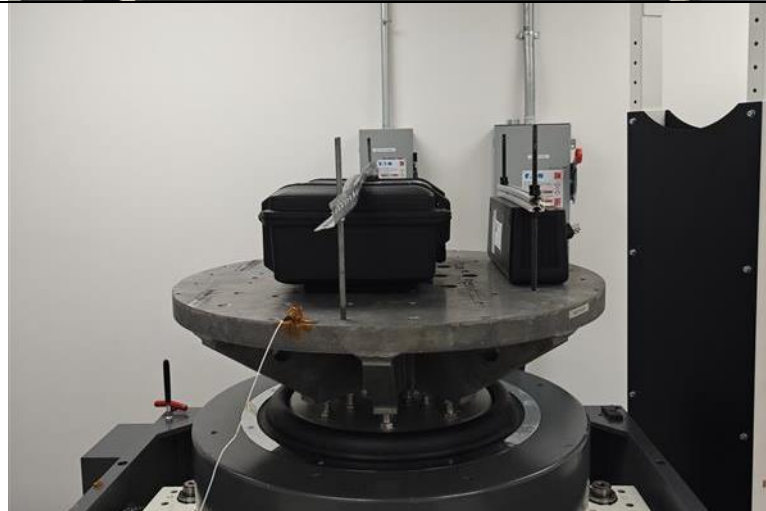
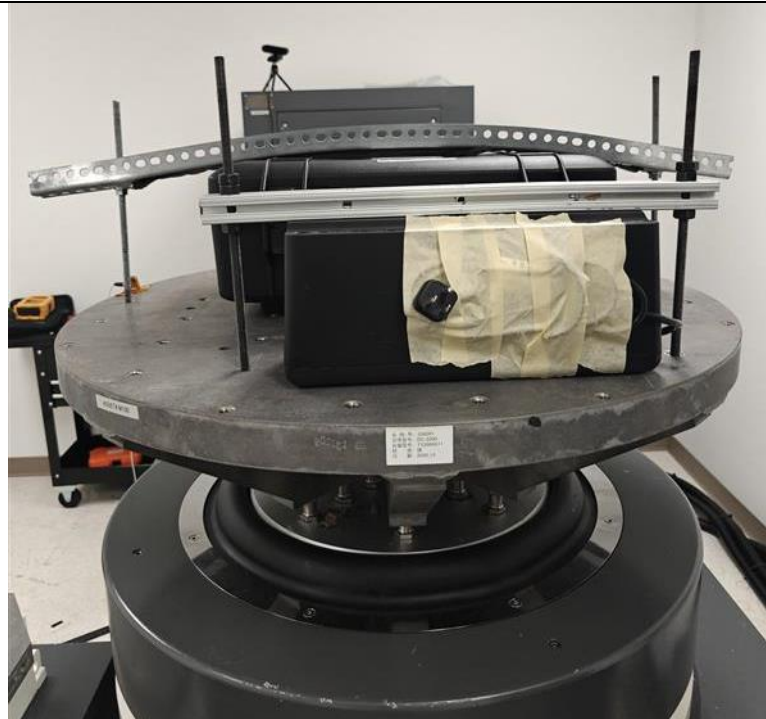
|                |
|----------------|
| Testing Setups |
|----------------|

|                          |
|--------------------------|
| <b>Z-Axis (Vertical)</b> |
| <b>Setup</b>             |
| <b>Run 1</b>             |



**Run 2**

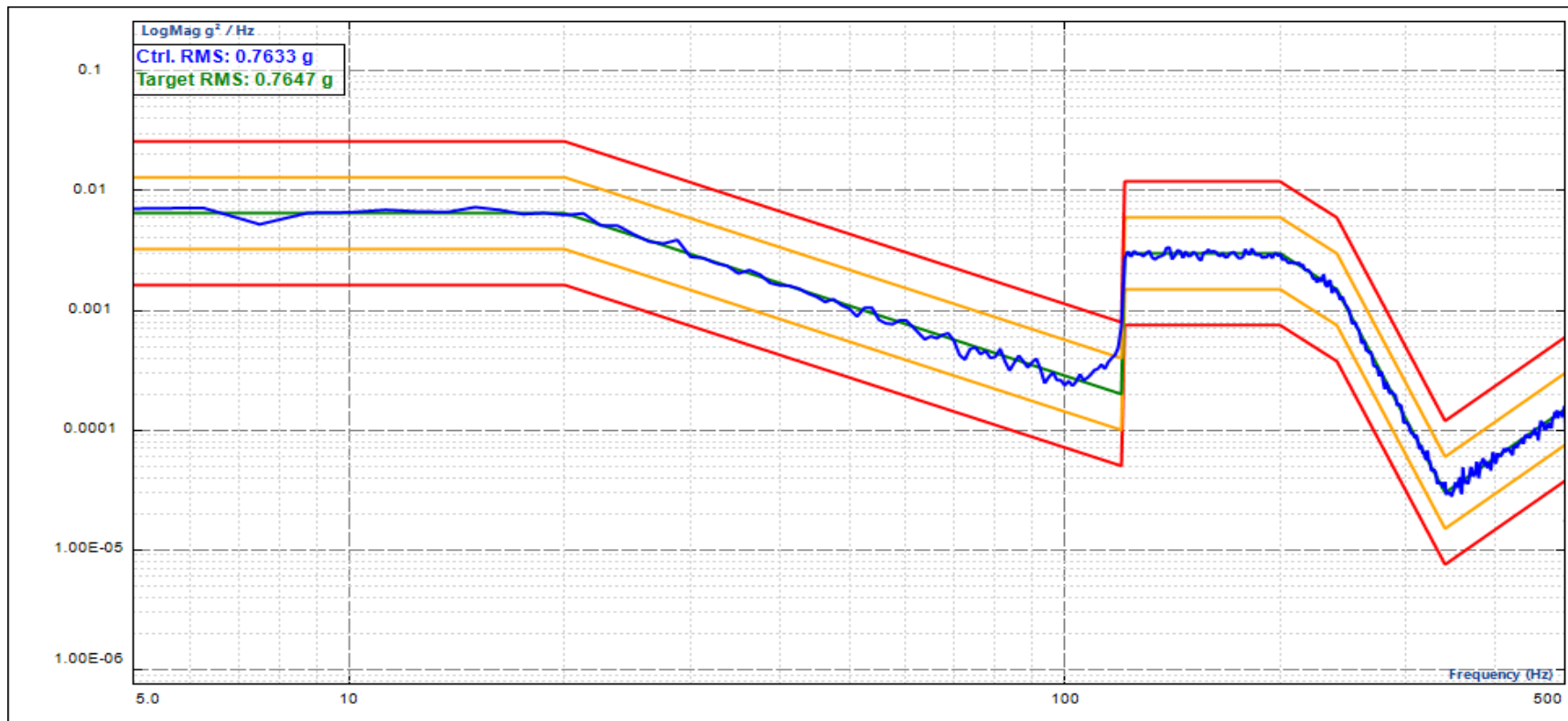
## Testing Setups



## Test Report

**Report time:** 9/24/2024 11:15:51 PM**Test name:** MIL-STD-810H Longitudinal test 514.8C-223**Test status:** Test Stopped (Schedule Finished)  
40 PM**Data measured at:** 9/24/2024 11:15:45 PM**Test type:** Random**Run folder name:** Longitudinal 514.8C-2 Novo X-Axis Run 1 9-24-2024 3-14-

### Control Composite

**Remaining time:** 00:00:00**Total elapsed time:** 08:01:06**Full level elapsed time:** 08:00:00

This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

## Method 514.8C-2 – Category 4 – Common Carrier Longitudinal

**Lines:** 400  
**Average:** 60

**DOF:** 120  
**Run start time:** 9/24/2024 3:14:41 PM

**Frequency range (fa):** Calculated by profile  
**Data measured at:** 9/24/2024 11:16:31 PM

## Run Log

| Absolute time   | Test Time | Event type          | Ctrl./Target RMS | Event Data | Event Source |
|---|-----------|---------------------|------------------|------------|--------------|
| <b>Random test run log 9/24/2024 3:15:26 PM</b>   |           |                     |                  |            |              |
| <b>MIL-STD-810H Longitudinal test 514.8C-223: No description</b>                                    |           |                     |                  |            |              |
| <b>Run description: MIL-STD-810H Longitudinal test 514.8C-223/Longitudinal 514.8C-2 Novo X-Axis</b> |           |                     |                  |            |              |
| 9/24/2024 3:15:30 PM  | 00:00:00  | Measuring noise     | 0.007/0.007 g    | 0          | System       |
| 3:15:33 PM  | 00:00:00  | Running in pre-test | 0.016/0.076 g    | 0          | System       |
| 3:15:43 PM  | 00:00:00  | Pretest finished    | 0.115/0.076 g    | 0          | System       |
| 3:15:48 PM  | 00:00:00  | Start schedule      |                  | 0          | User Cmd     |
| 3:15:55 PM  | 00:00:03  | Schedule level      | 0.129/0.191 g    | 25.00%     | Schedule     |
| 3:16:10 PM  | 00:00:19  | Schedule level      | 0.423/0.382 g    | 50.00%     | Schedule     |
| 3:16:21 PM  | 00:00:29  | Schedule level      | 0.617/0.574 g    | 75.00%     | Schedule     |
| 3:16:32 PM  | 00:00:41  | Schedule level      | 0.797/0.765 g    | 100.00%    | Schedule     |
| 11:16:31 PM   | 08:00:40  | Create report       |                  | 4096       | Action       |
| 11:16:31 PM   | 08:00:40  | Stop the test       | 0.763/0.765 g    |            | Schedule     |
| 11:16:31 PM   | 08:00:40  | Schedule Finished   |                  | 2          | System       |
| <b>Scheduled tests finished successfully: full level elapsed: 08:00:00; total elapsed: 08:01:06</b> |           |                     |                  |            |              |

## Test Parameters

**Lines:** 400  
**Delta frequency:** 1.25 Hz  
**Drive limit (V Pk):** 2  
**Abort sensitivity:** 50%  
**Average:** 60  
**Level change rate:** 20dB/s  
**Adjust level step:** 10%

**DOF:** 120  
**Frequency range (fa):** Calculated by profile  
**Sigma clipping:** 5  
**Overlap Ratio:** 50%  
**Control strategy:** Single channel  
**Abort ramp down rate:** 20dB/s  
**Non-linear control:** Enabled

## Method 514.8C-2 – Category 4 – Common Carrier Longitudinal

**Input Channel Table**

| Location ID | On/Off | Measurement quantity | Unit | Sensitivity    | Input mode | High-Pass Filter Fc | Description |
|-------------|--------|----------------------|------|----------------|------------|---------------------|-------------|
| Ch2         | On     | Acceleration         | g    | 9.90472 (mV/g) | IEPE       | 2.0000 Hz           |             |

| Location ID | Channel type | Sensor S/N | Max sensor range (V) | Input range | Control weighting | Integration / Differentiation |
|-------------|--------------|------------|----------------------|-------------|-------------------|-------------------------------|
| Ch2         | Control      |            | 20.0000 (V)          | Auto        | N/A               | No Integration                |

Ch1,Ch3,Ch4 are turned off.

| Frequency | Acceleration                 | Slope           | High abort | High alarm | Low alarm | Low abort |
|-----------|------------------------------|-----------------|------------|------------|-----------|-----------|
| 5 Hz      | 0.0065 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 0 dB/oct        |            |            |           |           |
| 20 Hz     | 0.0065 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -5.84876 dB/oct |            |            |           |           |
| 120 Hz    | 0.0002 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 982.316 dB/oct  |            |            |           |           |
| 121 Hz    | 0.003 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 0 dB/oct        |            |            |           |           |
| 200 Hz    | 0.003 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -11.4445 dB/oct |            |            |           |           |
| 240 Hz    | 0.0015 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -33.8103 dB/oct |            |            |           |           |
| 340 Hz    | 3E-05 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 12.5625 dB/oct  |            |            |           |           |
| 500 Hz    | 0.00015 (g) <sup>2</sup> /Hz |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |

**Control RMS Limits during Test**

Calculate based on the table: Yes

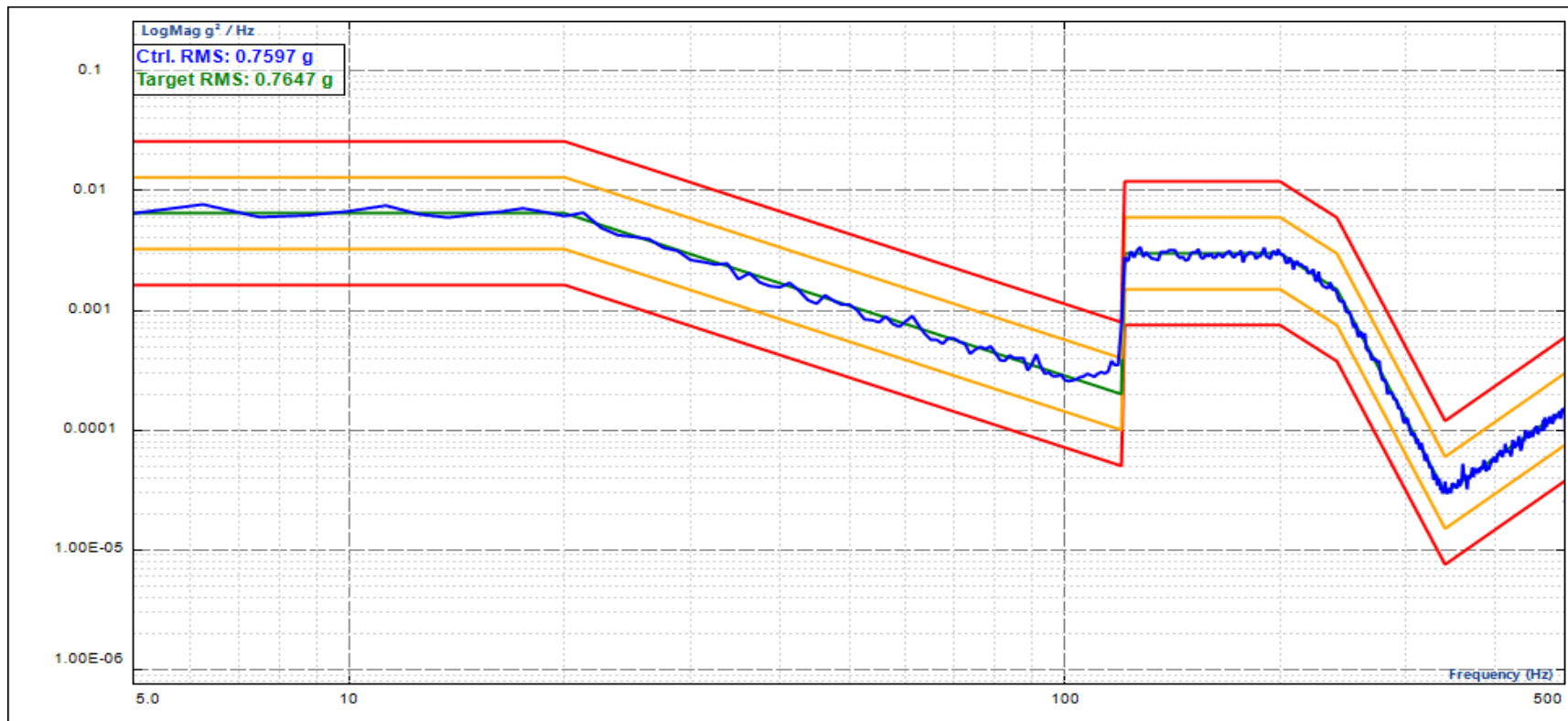
|             |                 |
|-------------|-----------------|
| Profile RMS | <b>0.7647 g</b> |
|-------------|-----------------|



## Test Report

**Report time:** 9/26/2024 4:06:46 PM**Test name:** MIL-STD-810H Longitudinal test 514.8C-223**Test status:** Test Stopped (Schedule Finished)  
28 AM**Data measured at:** 9/26/2024 4:06:41 PM**Test type:** Random**Run folder name:** Longitudinal 514.8C-2 Novo X-Axis Run 2 9-26-2024 8-05-

### Control Composite

**Remaining time:** 00:00:00**Total elapsed time:** 08:01:07**Full level elapsed time:** 08:00:00

## Method 514.8C-2 – Category 4 – Common Carrier Longitudinal

Lines: 400

DOF: 120

Frequency range (fa): Calculated by profile

Average: 60

Run start time: 9/26/2024 8:05:29 AM

Data measured at: 9/26/2024 4:07:28 PM

## Run Log

| Absolute time  | Test Time | Event type          | Ctrl./Target RMS | Event Data | Event Source |
|--|-----------|---------------------|------------------|------------|--------------|
| Random test run log 9/26/2024 8:06:16 AM   |           |                     |                  |            |              |
| MIL-STD-810H Longitudinal test 514.8C-223: No description  |           |                     |                  |            |              |
| Run description: MIL-STD-810H Longitudinal test 514.8C-223/Longitudinal 514.8C-2 Novo X-Axis Run 2 |           |                     |                  |            |              |
| 9/26/2024 8:06:20 AM   | 00:00:00  | Measuring noise     | 0.008/0.008 g    | 0          | System       |
| 8:06:23 AM   | 00:00:00  | Running in pre-test | 0.019/0.076 g    | 0          | System       |
| 8:06:33 AM   | 00:00:00  | Pretest finished    | 0.112/0.076 g    | 0          | System       |
| 8:06:45 AM   | 00:00:00  | Start schedule      |                  | 0          | User Cmd     |
| 8:06:52 AM   | 00:00:03  | Schedule level      | 0.154/0.191 g    | 25.00%     | Schedule     |
| 8:07:07 AM   | 00:00:19  | Schedule level      | 0.440/0.382 g    | 50.00%     | Schedule     |
| 8:07:18 AM   | 00:00:29  | Schedule level      | 0.628/0.574 g    | 75.00%     | Schedule     |
| 8:07:29 AM   | 00:00:41  | Schedule level      | 0.805/0.765 g    | 100.00%    | Schedule     |
| 4:07:28 PM   | 08:00:40  | Create report       |                  | 4096       | Action       |
| 4:07:28 PM   | 08:00:40  | Stop the test       | 0.760/0.765 g    |            | Schedule     |
| 4:07:28 PM   | 08:00:40  | Schedule Finished   |                  | 2          | System       |
| Scheduled tests finished successfully: full level elapsed: 08:00:00; total elapsed: 08:01:07       |           |                     |                  |            |              |

## Test Parameters

Lines: 400

DOF: 120

Delta frequency: 1.25 Hz

Frequency range (fa): Calculated by profile

Drive limit (V Pk): 2

Sigma clipping: 5

Abort sensitivity: 50%

Overlap Ratio: 50%

Average: 60

Control strategy: Single channel

Level change rate: 20dB/s

Abort ramp down rate: 20dB/s

Adjust level step: 10%

Non-linear control: Enabled

## Method 514.8C-2 – Category 4 – Common Carrier Longitudinal

**Input Channel Table**

| Location ID | On/Off | Measurement quantity | Unit | Sensitivity    | Input mode | High-Pass Filter Fc | Description |
|-------------|--------|----------------------|------|----------------|------------|---------------------|-------------|
| Ch2         | On     | Acceleration         | g    | 9.90472 (mV/g) | IEPE       | 2.0000 Hz           |             |

| Location ID | Channel type | Sensor S/N | Max sensor range (V) | Input range | Control weighting | Integration / Differentiation |
|-------------|--------------|------------|----------------------|-------------|-------------------|-------------------------------|
| Ch2         | Control      |            | 20.0000 (V)          | Auto        | N/A               | No Integration                |

Ch1,Ch3,Ch4 are turned off.

| Frequency | Acceleration                 | Slope           | High abort | High alarm | Low alarm | Low abort |
|-----------|------------------------------|-----------------|------------|------------|-----------|-----------|
| 5 Hz      | 0.0065 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 0 dB/oct        |            |            |           |           |
| 20 Hz     | 0.0065 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -5.84876 dB/oct |            |            |           |           |
| 120 Hz    | 0.0002 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 982.316 dB/oct  |            |            |           |           |
| 121 Hz    | 0.003 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 0 dB/oct        |            |            |           |           |
| 200 Hz    | 0.003 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -11.4445 dB/oct |            |            |           |           |
| 240 Hz    | 0.0015 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -33.8103 dB/oct |            |            |           |           |
| 340 Hz    | 3E-05 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 12.5625 dB/oct  |            |            |           |           |
| 500 Hz    | 0.00015 (g) <sup>2</sup> /Hz |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |

**Control RMS Limits during Test**

Calculate based on the table: Yes

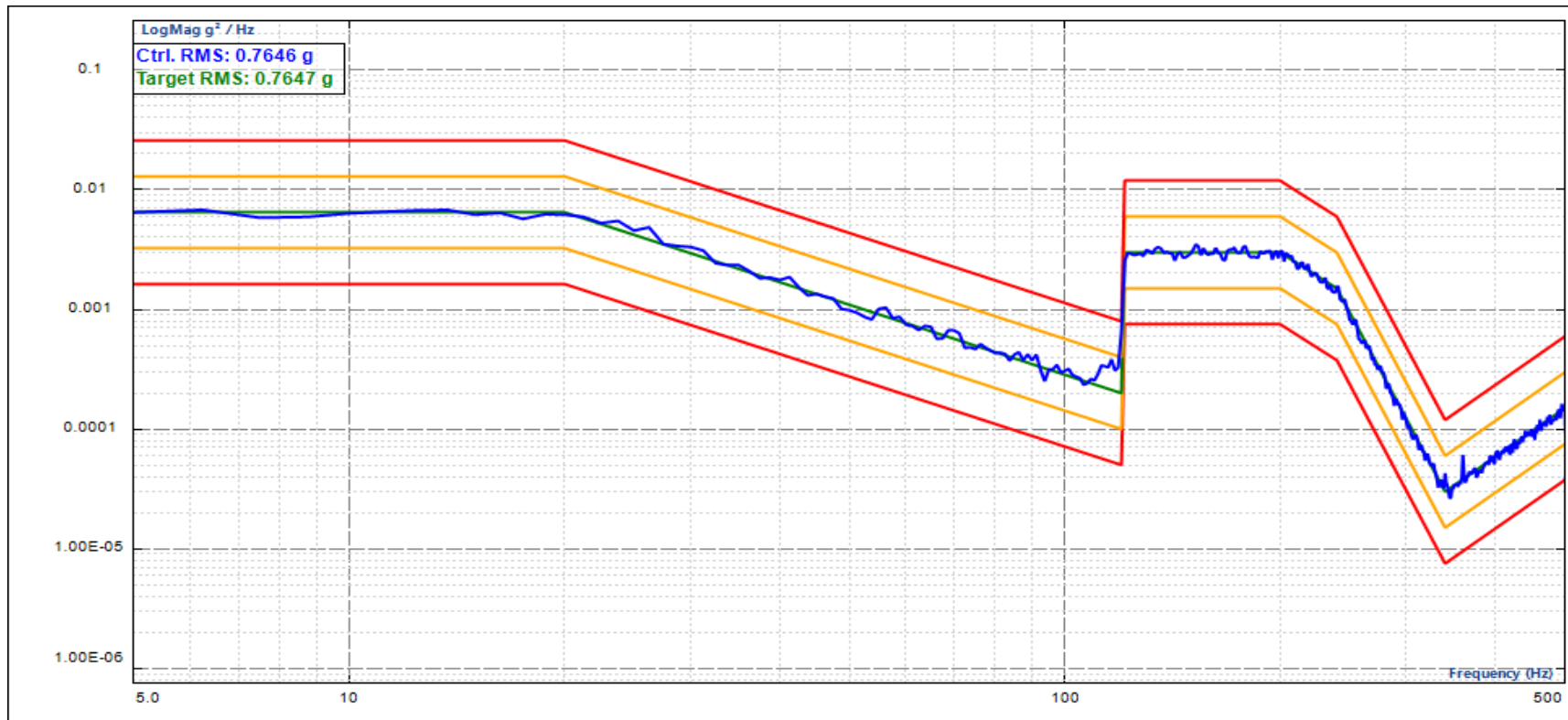
|             |                 |
|-------------|-----------------|
| Profile RMS | <b>0.7647 g</b> |
|-------------|-----------------|

## Method 514.8C-2 – Category 4 – Common Carrier Longitudinal

## Test Report

**Report time:** 9/25/2024 3:59:36 PM**Test name:** MIL-STD-810H Longitudinal test 514.8C-223**Test status:** Test Stopped (Schedule Finished)  
00 AM**Data measured at:** 9/25/2024 3:59:31 PM**Test type:** Random**Run folder name:** Longitudinal 514.8C-2 Novo Y-Axis Run 1 9-25-2024 7-58-

### Control Composite

**Remaining time:** 00:00:00**Lines:** 400**Total elapsed time:** 08:01:05**DOF:** 120**Full level elapsed time:** 08:00:00**Frequency range (fa):** Calculated by profile

## Method 514.8C-2 – Category 4 – Common Carrier Longitudinal

**Average:** 60**Run start time:** 9/25/2024 7:58:01 AM**Data measured at:** 9/25/2024 4:00:17 PM**Run Log**

| Absolute time   | Test Time | Event type          | Ctrl./Target RMS | Event Data | Event Source |
|---|-----------|---------------------|------------------|------------|--------------|
| <b>Random test run log 9/25/2024 7:58:47 AM</b>   |           |                     |                  |            |              |
| <b>MIL-STD-810H Longitudinal test 514.8C-223: No description</b>  |           |                     |                  |            |              |
| <b>Run description: MIL-STD-810H Longitudinal test 514.8C-223/Longitudinal 514.8C-2 Novo Y-Axis Run 1</b> |           |                     |                  |            |              |
| 9/25/2024 7:58:51 AM  | 00:00:00  | Measuring noise     | 0.008/0.008 g    | 0          | System       |
| 7:58:54 AM  | 00:00:00  | Running in pre-test | 0.018/0.076 g    | 0          | System       |
| 7:59:03 AM  | 00:00:00  | Pretest finished    | 0.102/0.076 g    | 0          | System       |
| 7:59:34 AM  | 00:00:00  | Start schedule      |                  | 0          | User Cmd     |
| 7:59:41 AM  | 00:00:03  | Schedule level      | 0.122/0.191 g    | 25.00%     | Schedule     |
| 7:59:56 AM  | 00:00:19  | Schedule level      | 0.450/0.382 g    | 50.00%     | Schedule     |
| 8:00:07 AM  | 00:00:29  | Schedule level      | 0.640/0.574 g    | 75.00%     | Schedule     |
| 8:00:18 AM  | 00:00:41  | Schedule level      | 0.813/0.765 g    | 100.00%    | Schedule     |
| 4:00:17 PM  | 08:00:40  | Create report       |                  | 4096       | Action       |
| 4:00:17 PM  | 08:00:40  | Stop the test       | 0.764/0.765 g    |            | Schedule     |
| 4:00:17 PM  | 08:00:40  | Schedule Finished   |                  | 2          | System       |
| <b>Scheduled tests finished successfully: full level elapsed: 08:00:00; total elapsed: 08:01:05</b>       |           |                     |                  |            |              |

**Test Parameters****Lines:** 400**Delta frequency:** 1.25 Hz**Drive limit (V Pk):** 2**Abort sensitivity:** 50%**Average:** 60**Level change rate:** 20dB/s**Adjust level step:** 10%**DOF:** 120**Frequency range (fa):** Calculated by profile**Sigma clipping:** 5**Overlap Ratio:** 50%**Control strategy:** Single channel**Abort ramp down rate:** 20dB/s**Non-linear control:** Enabled

## Method 514.8C-2 – Category 4 – Common Carrier Longitudinal

**Input Channel Table**

| Location ID | On/Off | Measurement quantity | Unit | Sensitivity    | Input mode | High-Pass Filter Fc | Description |
|-------------|--------|----------------------|------|----------------|------------|---------------------|-------------|
| Ch2         | On     | Acceleration         | g    | 9.90472 (mV/g) | IEPE       | 2.0000 Hz           |             |

| Location ID | Channel type | Sensor S/N | Max sensor range (V) | Input range | Control weighting | Integration / Differentiation |
|-------------|--------------|------------|----------------------|-------------|-------------------|-------------------------------|
| Ch2         | Control      |            | 20.0000 (V)          | Auto        | N/A               | No Integration                |

Ch1,Ch3,Ch4 are turned off.

| Frequency | Acceleration                 | Slope           | High abort | High alarm | Low alarm | Low abort |
|-----------|------------------------------|-----------------|------------|------------|-----------|-----------|
| 5 Hz      | 0.0065 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 0 dB/oct        |            |            |           |           |
| 20 Hz     | 0.0065 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -5.84876 dB/oct |            |            |           |           |
| 120 Hz    | 0.0002 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 982.316 dB/oct  |            |            |           |           |
| 121 Hz    | 0.003 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 0 dB/oct        |            |            |           |           |
| 200 Hz    | 0.003 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -11.4445 dB/oct |            |            |           |           |
| 240 Hz    | 0.0015 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -33.8103 dB/oct |            |            |           |           |
| 340 Hz    | 3E-05 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 12.5625 dB/oct  |            |            |           |           |
| 500 Hz    | 0.00015 (g) <sup>2</sup> /Hz |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |

**Control RMS Limits during Test**

Calculate based on the table: Yes

|             |                 |
|-------------|-----------------|
| Profile RMS | <b>0.7647 g</b> |
|-------------|-----------------|

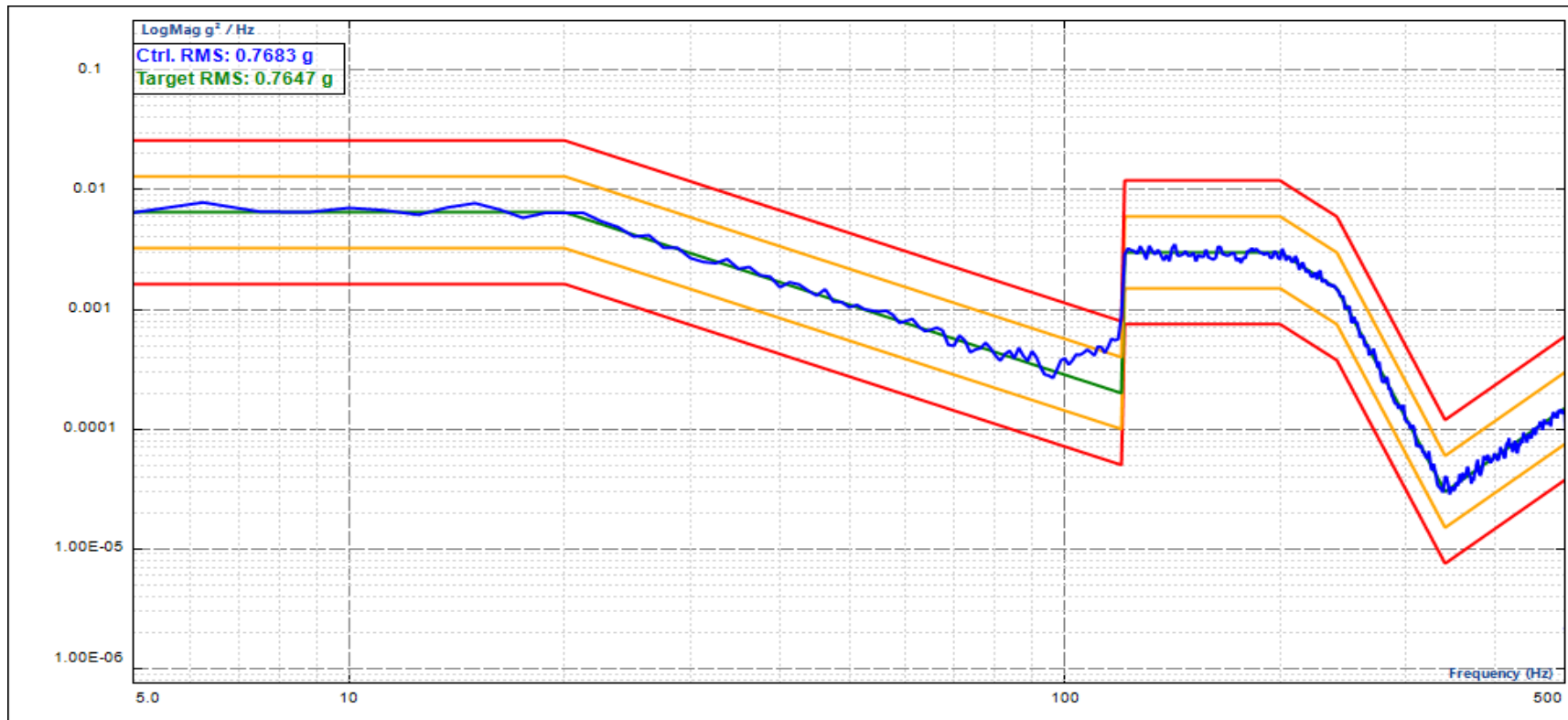


## Method 514.8C-2 – Category 4 – Common Carrier Longitudinal

## Test Report

**Report time:** 9/27/2024 4:27:19 PM**Test name:** MIL-STD-810H Longitudinal test 514.8C-223**Test status:** Test Stopped (Schedule Finished)  
59 AM**Data measured at:** 9/27/2024 4:27:13 PM**Test type:** Random**Run folder name:** Longitudinal 514.8C-2 Novo Y-Axis Run 2 9-27-2024 8-25-

### Control Composite

**Remaining time:** 00:00:00**Lines:** 400**Total elapsed time:** 08:01:07**DOF:** 120**Full level elapsed time:** 08:00:00**Frequency range (fa):** Calculated by profile

## Method 514.8C-2 – Category 4 – Common Carrier Longitudinal

Average: 60

Run start time: 9/27/2024 8:26:00 AM

Data measured at: 9/27/2024 4:28:01 PM

## Run Log

| Absolute time  | Test Time | Event type          | Ctrl./Target RMS | Event Data | Event Source |
|--|-----------|---------------------|------------------|------------|--------------|
| Random test run log 9/27/2024 8:26:47 AM   |           |                     |                  |            |              |
| MIL-STD-810H Longitudinal test 514.8C-223: No description  |           |                     |                  |            |              |
| Run description: MIL-STD-810H Longitudinal test 514.8C-223/Longitudinal 514.8C-2 Novo Y-Axis Run 2 |           |                     |                  |            |              |
| 9/27/2024 8:26:51 AM   | 00:00:00  | Measuring noise     | 0.008/0.008 g    | 0          | System       |
| 8:26:55 AM   | 00:00:00  | Running in pre-test | 0.020/0.076 g    | 0          | System       |
| 8:27:05 AM   | 00:00:00  | Pretest finished    | 0.108/0.076 g    | 0          | System       |
| 8:27:18 AM   | 00:00:00  | Start schedule      |                  | 0          | User Cmd     |
| 8:27:25 AM   | 00:00:03  | Schedule level      | 0.141/0.191 g    | 25.00%     | Schedule     |
| 8:27:40 AM   | 00:00:19  | Schedule level      | 0.450/0.382 g    | 50.00%     | Schedule     |
| 8:27:51 AM   | 00:00:29  | Schedule level      | 0.634/0.574 g    | 75.00%     | Schedule     |
| 8:28:02 AM   | 00:00:41  | Schedule level      | 0.812/0.765 g    | 100.00%    | Schedule     |
| 4:28:01 PM   | 08:00:40  | Create report       |                  | 4096       | Action       |
| 4:28:01 PM   | 08:00:40  | Stop the test       | 0.768/0.765 g    |            | Schedule     |
| 4:28:01 PM   | 08:00:40  | Schedule Finished   |                  | 2          | System       |
| Scheduled tests finished successfully: full level elapsed: 08:00:00; total elapsed: 08:01:07       |           |                     |                  |            |              |

## Test Parameters

Lines: 400

Delta frequency: 1.25 Hz

Drive limit (V Pk): 2

Abort sensitivity: 50%

Average: 60

Level change rate: 20dB/s

Adjust level step: 10%

DOF: 120

Frequency range (fa): Calculated by profile

Sigma clipping: 5

Overlap Ratio: 50%

Control strategy: Single channel

Abort ramp down rate: 20dB/s

Non-linear control: Enabled

## Method 514.8C-2 – Category 4 – Common Carrier Longitudinal

**Input Channel Table**

| Location ID | On/Off | Measurement quantity | Unit | Sensitivity    | Input mode | High-Pass Filter Fc | Description |
|-------------|--------|----------------------|------|----------------|------------|---------------------|-------------|
| Ch2         | On     | Acceleration         | g    | 9.90472 (mV/g) | IEPE       | 2.0000 Hz           |             |

| Location ID | Channel type | Sensor S/N | Max sensor range (V) | Input range | Control weighting | Integration / Differentiation |
|-------------|--------------|------------|----------------------|-------------|-------------------|-------------------------------|
| Ch2         | Control      |            | 20.0000 (V)          | Auto        | N/A               | No Integration                |

Ch1,Ch3,Ch4 are turned off.

| Frequency | Acceleration                 | Slope           | High abort | High alarm | Low alarm | Low abort |
|-----------|------------------------------|-----------------|------------|------------|-----------|-----------|
| 5 Hz      | 0.0065 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 0 dB/oct        |            |            |           |           |
| 20 Hz     | 0.0065 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -5.84876 dB/oct |            |            |           |           |
| 120 Hz    | 0.0002 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 982.316 dB/oct  |            |            |           |           |
| 121 Hz    | 0.003 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 0 dB/oct        |            |            |           |           |
| 200 Hz    | 0.003 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -11.4445 dB/oct |            |            |           |           |
| 240 Hz    | 0.0015 (g) <sup>2</sup> /Hz  |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -33.8103 dB/oct |            |            |           |           |
| 340 Hz    | 3E-05 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 12.5625 dB/oct  |            |            |           |           |
| 500 Hz    | 0.00015 (g) <sup>2</sup> /Hz |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |

**Control RMS Limits during Test**

Calculate based on the table: Yes

|             |                 |
|-------------|-----------------|
| Profile RMS | <b>0.7647 g</b> |
|-------------|-----------------|

## Test Report

**Report time:** 9/30/2024 7:14:32 PM

**Test name:** MIL-STD-810H Vertical test 514.8C-224

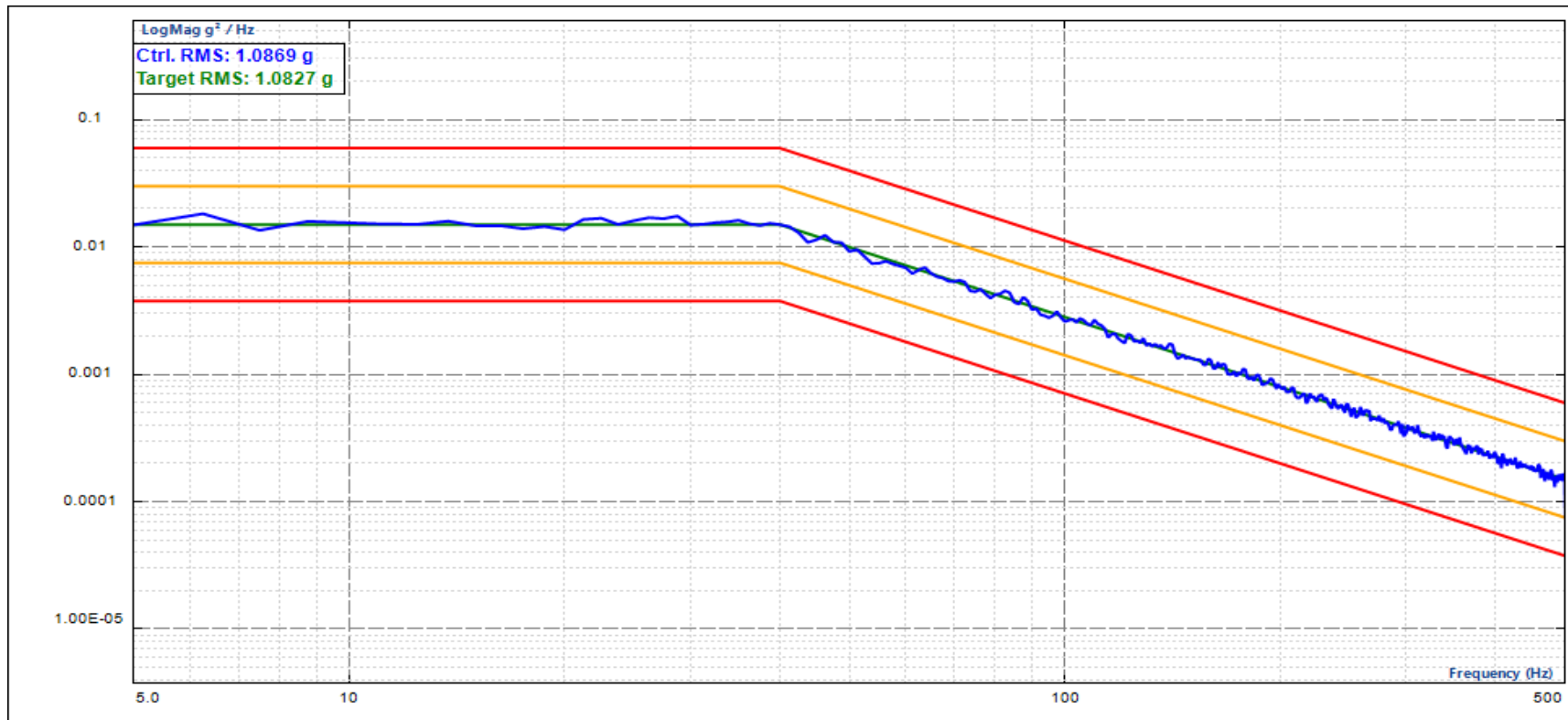
**Test status:** Test Stopped (Schedule Finished)  
AM

**Data measured at:** 9/30/2024 7:14:27 PM

**Test type:** Random

**Run folder name:** Vert 514.8C-224 Novo Z-Axis Run 1 9-30-2024 11-13-22

## Control Composite



**Remaining time:** 00:00:00

**Lines:** 400

**Total elapsed time:** 08:01:04

**DOF:** 120

**Full level elapsed time:** 08:00:00

**Frequency range (fa):** Calculated by profile

This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

Method 514.8C-2 – Category 4 – Common Carrier Vertical

Average: 60

Run start time: 9/30/2024 11:13:23 AM

Data measured at: 9/30/2024 7:15:17 PM

**Run Log**

| Absolute time  | Test Time | Event type          | Ctrl./Target RMS | Event Data | Event Source |
|--|-----------|---------------------|------------------|------------|--------------|
| Random test run log 9/30/2024 11:14:13 AM  |           |                     |                  |            |              |
| MIL-STD-810H Vertical test 514.8C-224: No description  |           |                     |                  |            |              |
| Run description: MIL-STD-810H Vertical test 514.8C-224/Vert 514.8C-224 Novo Z-Axis Run 1     |           |                     |                  |            |              |
| 9/30/2024 11:14:17 AM  | 00:00:00  | Measuring noise     | 0.009/0.009 g    | 0          | System       |
| 11:14:19 AM  | 00:00:00  | Running in pre-test | 0.021/0.108 g    | 0          | System       |
| 11:14:28 AM  | 00:00:00  | Pretest finished    | 0.119/0.108 g    | 0          | System       |
| 11:14:35 AM  | 00:00:00  | Start schedule      |                  | 0          | User Cmd     |
| 11:14:42 AM  | 00:00:03  | Schedule level      | 0.173/0.271 g    | 25.00%     | Schedule     |
| 11:14:56 AM  | 00:00:18  | Schedule level      | 0.543/0.541 g    | 50.00%     | Schedule     |
| 11:15:07 AM  | 00:00:29  | Schedule level      | 0.811/0.812 g    | 75.00%     | Schedule     |
| 11:15:18 AM  | 00:00:40  | Schedule level      | 1.091/1.083 g    | 100.00%    | Schedule     |
| 7:15:17 PM   | 08:00:39  | Create report       |                  | 4096       | Action       |
| 7:15:17 PM   | 08:00:39  | Stop the test       | 1.086/1.083 g    |            | Schedule     |
| 7:15:17 PM   | 08:00:39  | Schedule Finished   |                  | 2          | System       |
| Scheduled tests finished successfully: full level elapsed: 08:00:00; total elapsed: 08:01:04 |           |                     |                  |            |              |

**Test Parameters**

Lines: 400

Delta frequency: 1.25 Hz

Drive limit (V Pk): 2

Abort sensitivity: 50%

Average: 60

Level change rate: 20dB/s

Adjust level step: 10%

DOF: 120

Frequency range (fa): Calculated by profile

Sigma clipping: 5

Overlap Ratio: 50%

Control strategy: Single channel

Abort ramp down rate: 20dB/s

Non-linear control: Enabled

## Method 514.8C-2 – Category 4 – Common Carrier Vertical

**Input Channel Table**

| Location ID | On/Off | Measurement quantity | Unit | Sensitivity    | Input mode | High-Pass Filter Fc | Description |
|-------------|--------|----------------------|------|----------------|------------|---------------------|-------------|
| Ch2         | On     | Acceleration         | g    | 9.90472 (mV/g) | IEPE       | 2.0000 Hz           |             |

| Location ID | Channel type | Sensor S/N | Max sensor range (V) | Input range | Control weighting | Integration / Differentiation |
|-------------|--------------|------------|----------------------|-------------|-------------------|-------------------------------|
| Ch2         | Control      |            | 20.0000 (V)          | Auto        | N/A               | No Integration                |

Ch1,Ch3,Ch4 are turned off.

| Frequency | Acceleration                 | Slope           | High abort | High alarm | Low alarm | Low abort |
|-----------|------------------------------|-----------------|------------|------------|-----------|-----------|
| 5 Hz      | 0.015 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 0 dB/oct        |            |            |           |           |
| 40 Hz     | 0.015 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -5.48869 dB/oct |            |            |           |           |
| 500 Hz    | 0.00015 (g) <sup>2</sup> /Hz |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |

**Control RMS Limits during Test**

Calculate based on the table: Yes

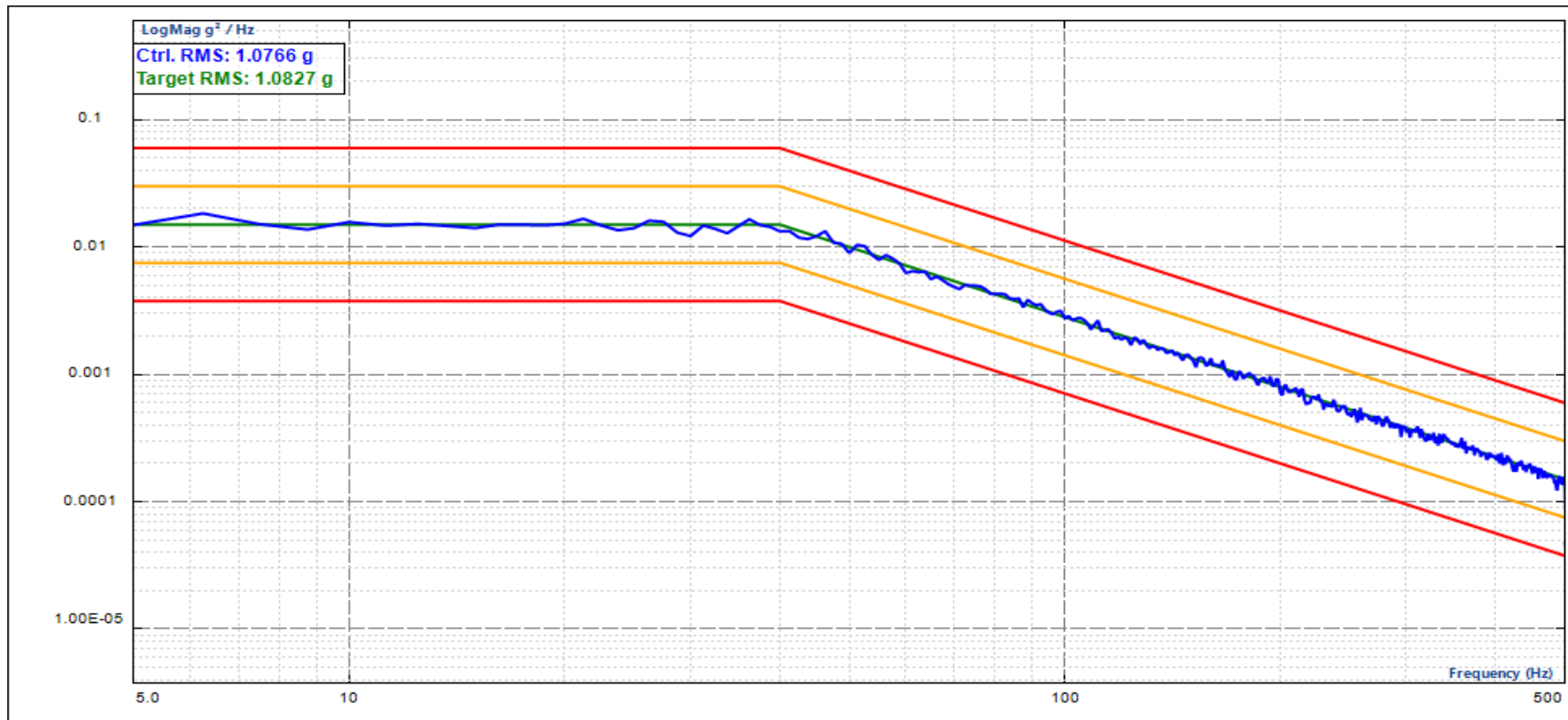
|             |                 |
|-------------|-----------------|
| Profile RMS | <b>1.0827 g</b> |
|-------------|-----------------|



## Test Report

**Report time:** 10/1/2024 4:19:44 PM**Test name:** MIL-STD-810H Vertical test 514.8C-224**Test status:** Test Stopped (Schedule Finished)  
AM**Data measured at:** 10/1/2024 4:19:39 PM**Test type:** Random**Run folder name:** Vert 514.8C-224 Novo Z-Axis Run 2 10-1-2024 8-18-35

### Control Composite

**Remaining time:** 00:00:00**Lines:** 400**Total elapsed time:** 08:01:04**DOF:** 120**Full level elapsed time:** 08:00:00**Frequency range (fa):** Calculated by profile

Method 514.8C-2 – Category 4 – Common Carrier Vertical

**Average:** 60**Run start time:** 10/1/2024 8:18:36 AM**Data measured at:** 10/1/2024 4:20:30 PM**Run Log**

| Absolute time   | Test Time | Event type          | Ctrl./Target RMS | Event Data | Event Source |
|---|-----------|---------------------|------------------|------------|--------------|
| <b>Random test run log 10/1/2024 8:19:26 AM</b>   |           |                     |                  |            |              |
| <b>MIL-STD-810H Vertical test 514.8C-224: No description</b>  |           |                     |                  |            |              |
| <b>Run description: MIL-STD-810H Vertical test 514.8C-224/Vert 514.8C-224 Novo Z-Axis Run 2</b>     |           |                     |                  |            |              |
| 10/1/2024 8:19:30 AM  | 00:00:00  | Measuring noise     | 0.009/0.009 g    | 0          | System       |
| 8:19:32 AM  | 00:00:00  | Running in pre-test | 0.019/0.108 g    | 0          | System       |
| 8:19:42 AM  | 00:00:00  | Pretest finished    | 0.123/0.108 g    | 0          | System       |
| 8:19:47 AM  | 00:00:00  | Start schedule      |                  | 0          | User Cmd     |
| 8:19:54 AM  | 00:00:03  | Schedule level      | 0.170/0.271 g    | 25.00%     | Schedule     |
| 8:20:09 AM  | 00:00:18  | Schedule level      | 0.545/0.541 g    | 50.00%     | Schedule     |
| 8:20:20 AM  | 00:00:29  | Schedule level      | 0.812/0.812 g    | 75.00%     | Schedule     |
| 8:20:31 AM  | 00:00:40  | Schedule level      | 1.091/1.083 g    | 100.00%    | Schedule     |
| 4:20:30 PM  | 08:00:39  | Create report       |                  | 4096       | Action       |
| 4:20:30 PM  | 08:00:39  | Stop the test       | 1.076/1.083 g    |            | Schedule     |
| 4:20:30 PM  | 08:00:39  | Schedule Finished   |                  | 2          | System       |
| <b>Scheduled tests finished successfully: full level elapsed: 08:00:00; total elapsed: 08:01:04</b> |           |                     |                  |            |              |

**Test Parameters****Lines:** 400**Delta frequency:** 1.25 Hz**Drive limit (V Pk):** 2**Abort sensitivity:** 50%**Average:** 60**Level change rate:** 20dB/s**Adjust level step:** 10%**DOF:** 120**Frequency range (fa):** Calculated by profile**Sigma clipping:** 5**Overlap Ratio:** 50%**Control strategy:** Single channel**Abort ramp down rate:** 20dB/s**Non-linear control:** Enabled

## Method 514.8C-2 – Category 4 – Common Carrier Vertical

**Input Channel Table**

| Location ID | On/Off | Measurement quantity | Unit | Sensitivity    | Input mode | High-Pass Filter Fc | Description |
|-------------|--------|----------------------|------|----------------|------------|---------------------|-------------|
| Ch2         | On     | Acceleration         | g    | 9.90472 (mV/g) | IEPE       | 2.0000 Hz           |             |

| Location ID | Channel type | Sensor S/N | Max sensor range (V) | Input range | Control weighting | Integration / Differentiation |
|-------------|--------------|------------|----------------------|-------------|-------------------|-------------------------------|
| Ch2         | Control      |            | 20.0000 (V)          | Auto        | N/A               | No Integration                |

Ch1,Ch3,Ch4 are turned off.

| Frequency | Acceleration                 | Slope           | High abort | High alarm | Low alarm | Low abort |
|-----------|------------------------------|-----------------|------------|------------|-----------|-----------|
| 5 Hz      | 0.015 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | 0 dB/oct        |            |            |           |           |
| 40 Hz     | 0.015 (g) <sup>2</sup> /Hz   |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |
|           |                              | -5.48869 dB/oct |            |            |           |           |
| 500 Hz    | 0.00015 (g) <sup>2</sup> /Hz |                 | 6 dB       | 3 dB       | -3 dB     | -6 dB     |

**Control RMS Limits during Test**

Calculate based on the table: Yes

|             |                 |
|-------------|-----------------|
| Profile RMS | <b>1.0827 g</b> |
|-------------|-----------------|

## Samples after Vibration

The following photos were taken after the samples had been subjected to all 3 axes of testing (X, Y, Z).

**Sample A**

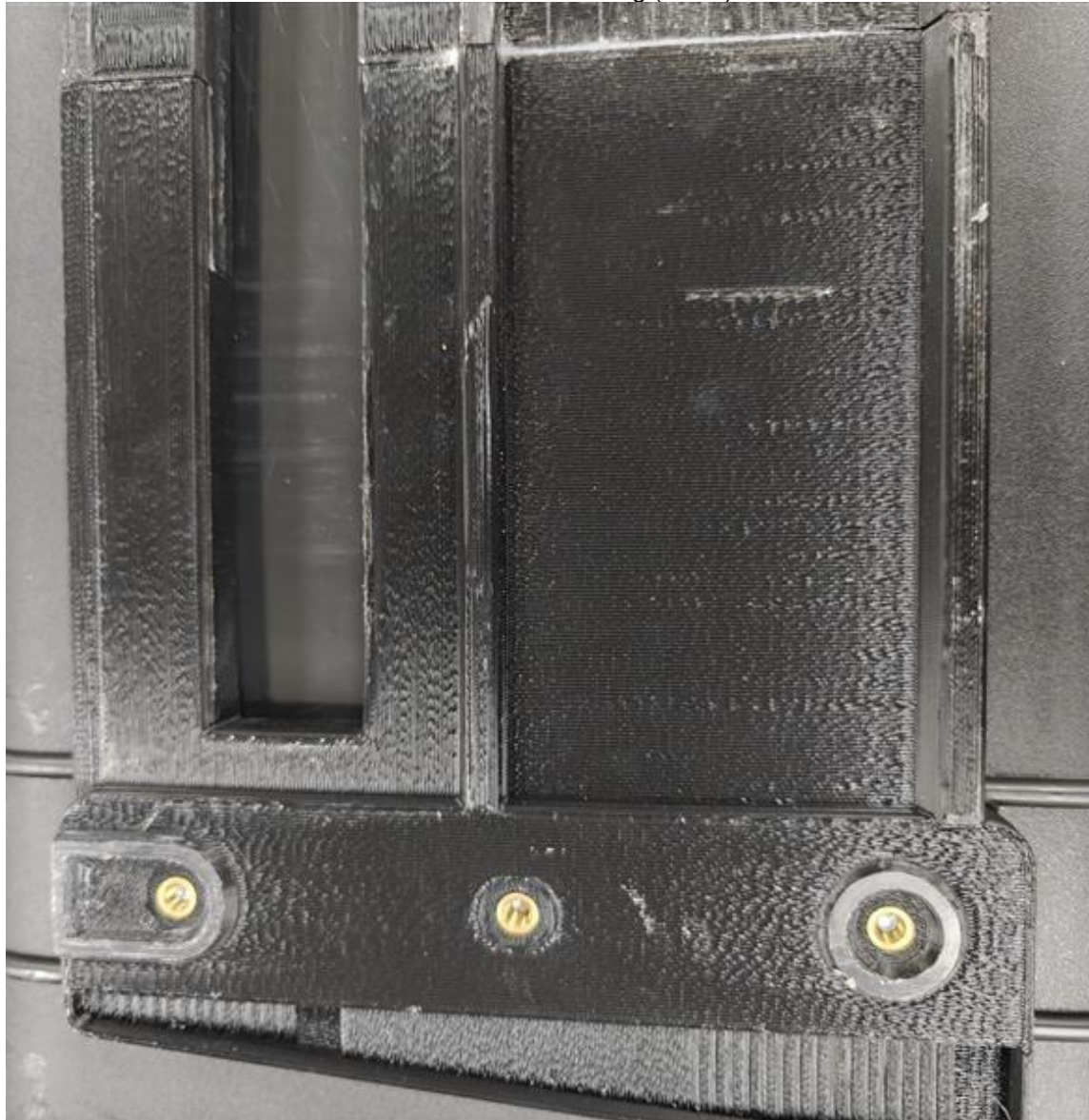
## Bottom Bracket Scuffing (1 of 2)



Note: Slight chipping and scuffing on the bottom bracket of the Pelican Case enclosed sample.

Samples after Vibration

Bottom Bracket Scuffing (2 of 2)



Note: Slight scuffing and wear on the bottom bracket.

Samples after Vibration

Bottom Scuffing



Note: Similar scuffing on both bottom side, located on the hinge side of the sample.

**Sample B (UPS)**



## Samples after Vibration

Bottom Scuffing



Note: Slight scuffing at bottom edge.

**Sample C**

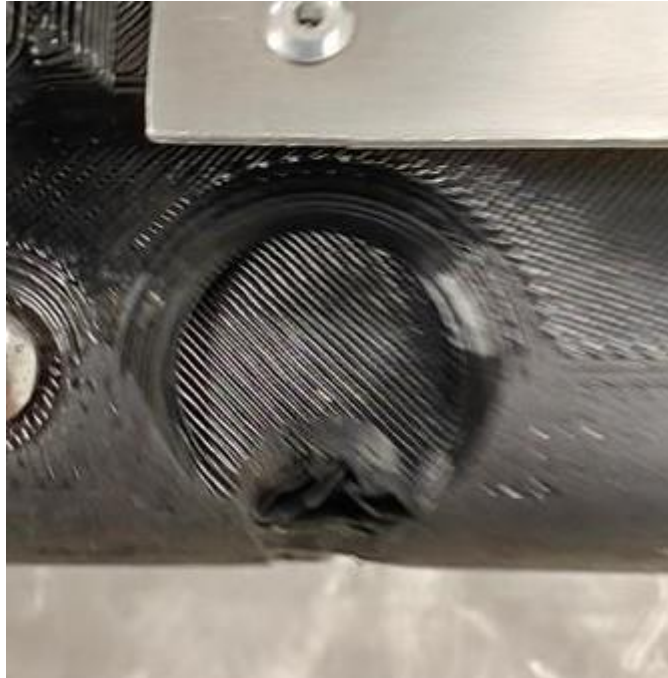
Divot Wholes



Note: Slight wholes in these divots of the 3D printed part. May not be the result of vibration testing.

Samples after Vibration

Divot Whole Close



Note: Closer view of the divot wholes referenced above

Samples after Vibration

Bottom Scuffing (1 of 3)



Note: Scuffing at the outer edge.

Samples after Vibration

Bottom Scuffing (2 of 3)



Note: Scuffing at outer edge.



## Samples after Vibration

Bottom Scuffing (3 of 3)



Note: Scuffing at the raised parts.

Wear on Strap



Note: Wear at the ends of the strap.

## Samples after Vibration

Top Scuffing



Note: Slight scuffing on the top of the sample, consistent with where the sample was secured to the table.