




# engineering dynamics

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## Test Report EN2477-2

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<b>VIBRATION TEST REPORT</b>	
<b>CUSTOMER</b>	Button-fix Limited Unit A, 1 Britton Street London EC1M 5NW
<b>ORDER NUMBER</b>	Jessica
<b>TEST DATE(S)</b>	29 <sup>th</sup> May 2019
<b>EQUIPMENT TESTED</b>	Four Button-fix Type 1s Plastic
<b>SERIAL NUMBER</b>	N/A
<b>TEST ENGINEER</b>	David Weeks
<b>TEST WITNESS</b>	N/A
<b>TEST ARRANGEMENT</b>	

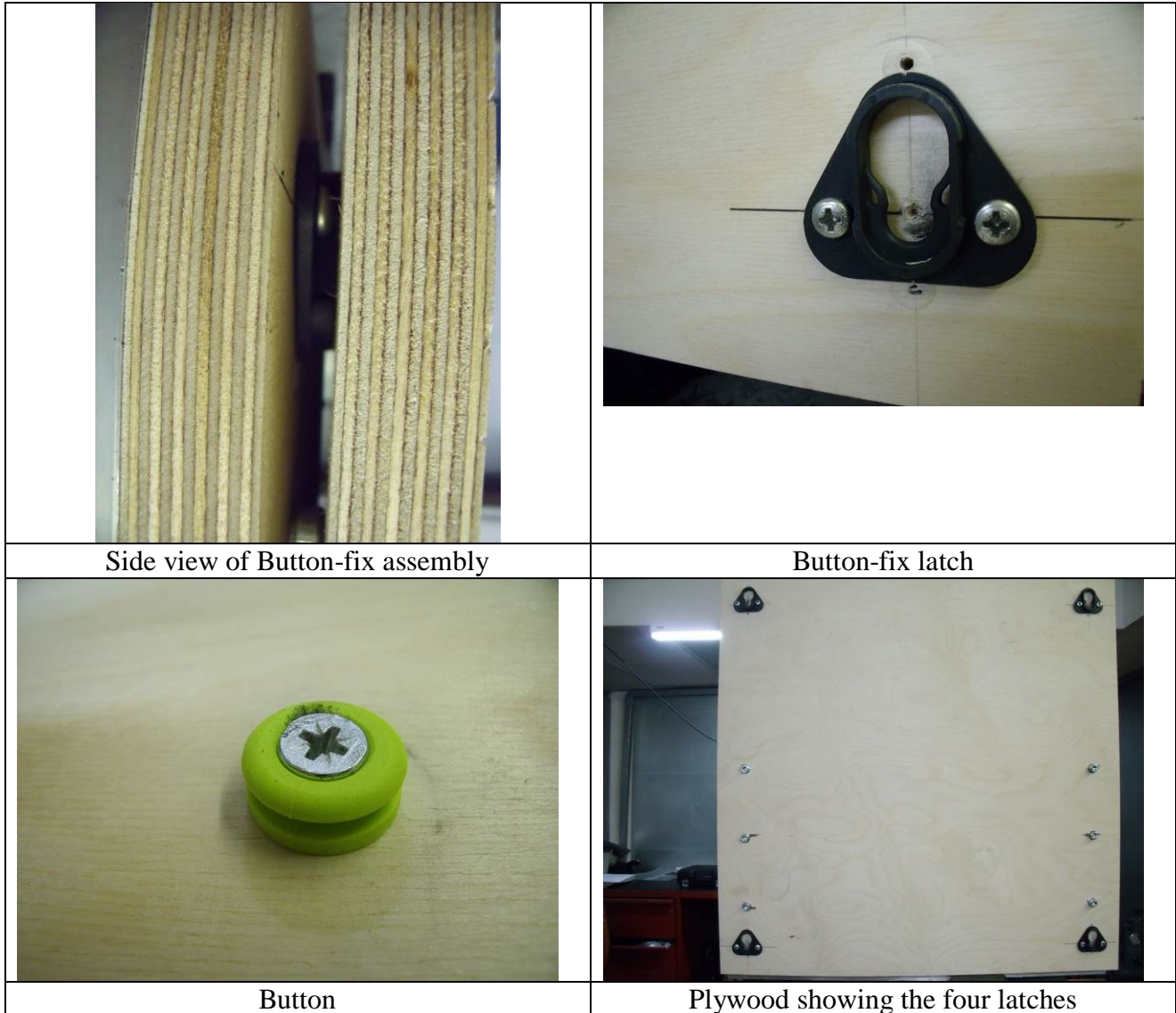


<b>TEST EQUIPMENT</b>				
<b>Item</b>	<b>Type Identification</b>	<b>Serial N°</b>	<b>Calibration Certificate No</b>	<b>Calibration Date</b>
Vibrator	Ling 900 Combo V826LS	533	The vibrator and amplifier are part of the generating system, calibration of which is achieved by the Control Accelerometer.	
Amplifier	Ling DPA 16	204		
Controller	Bruel & Kjaer Laser USB LAS-200	10848686	CMR182115	29 October 2018
Reference Accelerometer	Endevco 213E	RE58	CMR182116	24 October 2018
Control Accelerometer	DJB	6012	ENV2466	25 March 2019
Response Accelerometer	DJB	11818	ENV2466	25 March 2019



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Four Button-fix Type S Plastic quick release fasteners were attached to two pieces of plywood 70cm x 70cm x 1.8cm at 60cm centres. The total weight of buttons and outer plywood was 5.7Kgs.

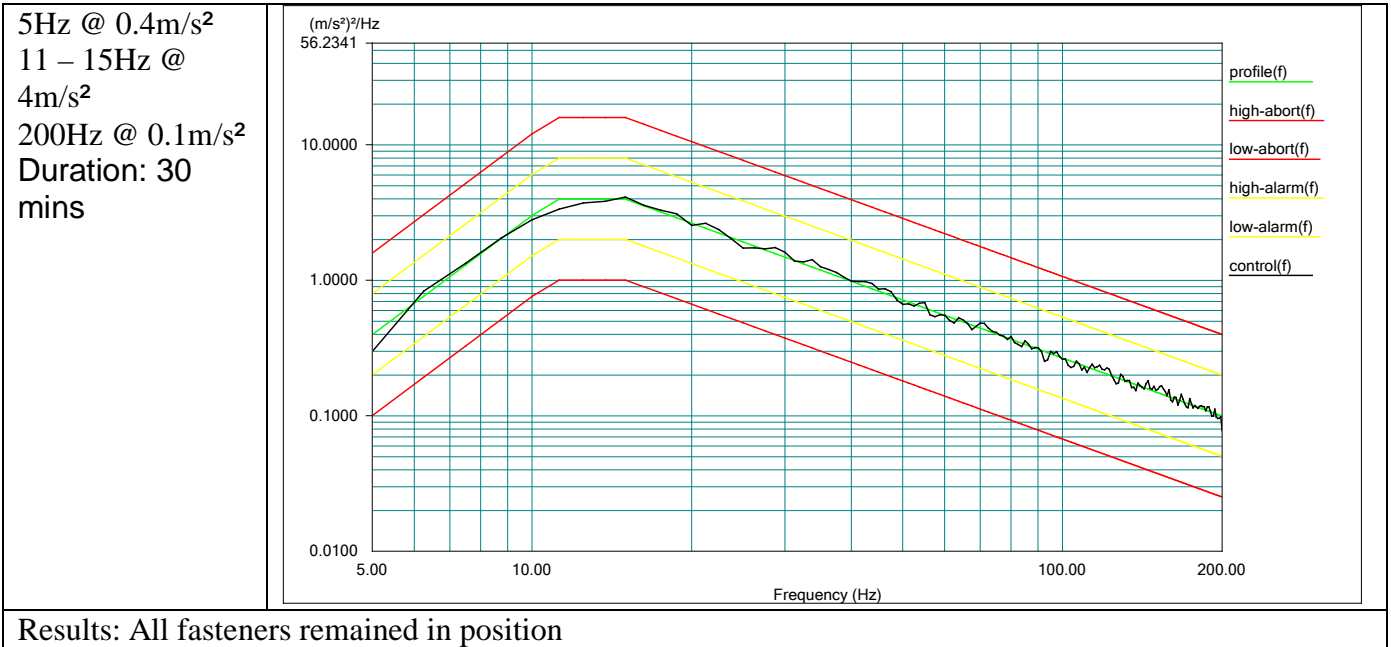




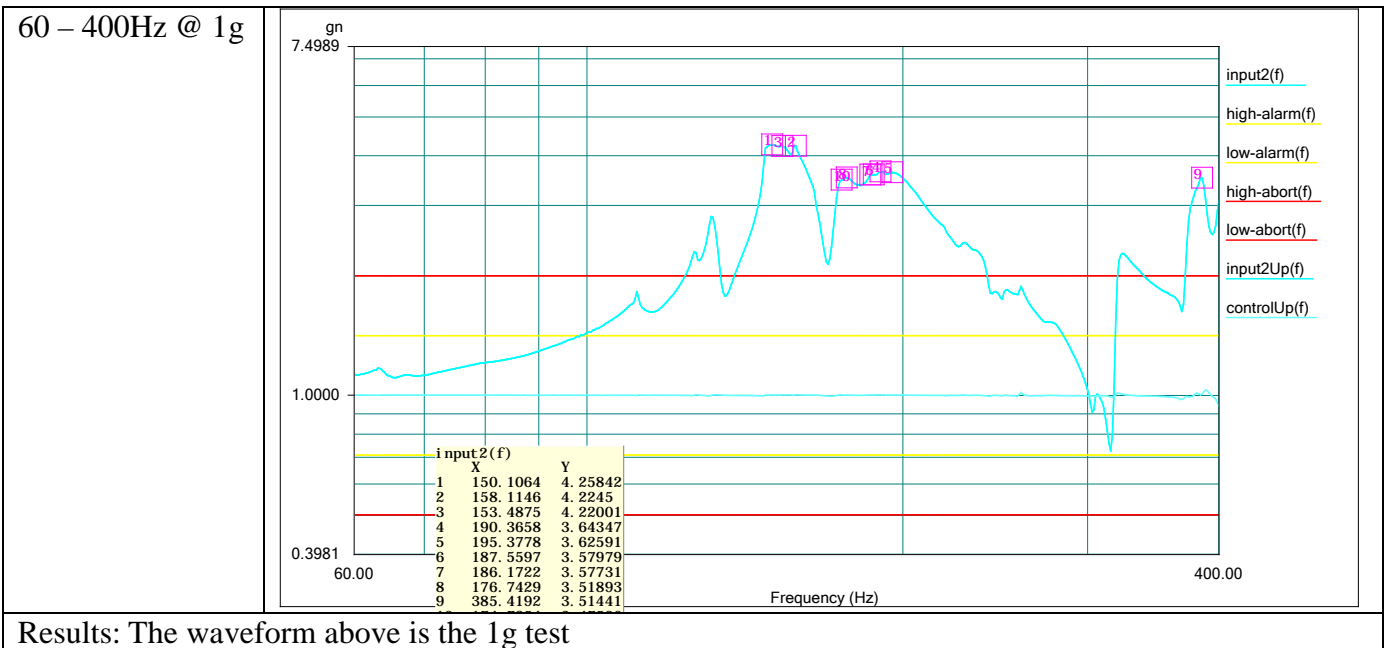
# Test Report EN2477-2

Vibration Test carried out on the assembly were as follows:

1. Random: Vibration similar to IEC 60068-2 Vertical axis but with a duration of 30minutes.

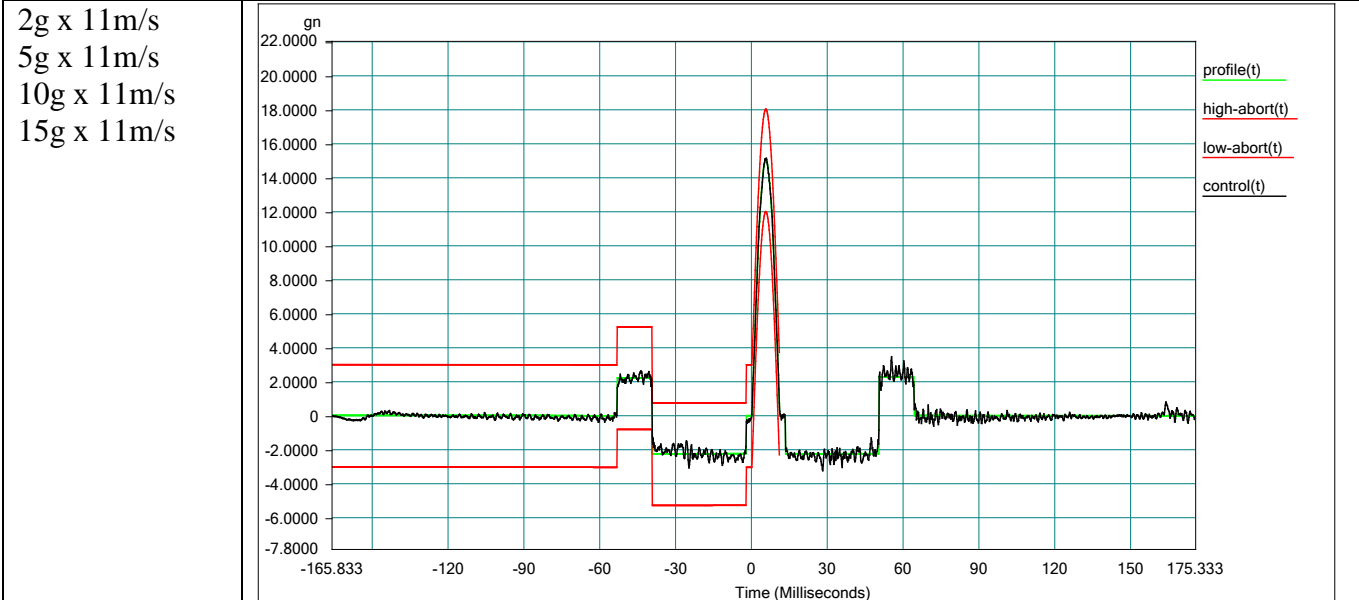


2. Sinusoidal: The waveform below shows accelerometer



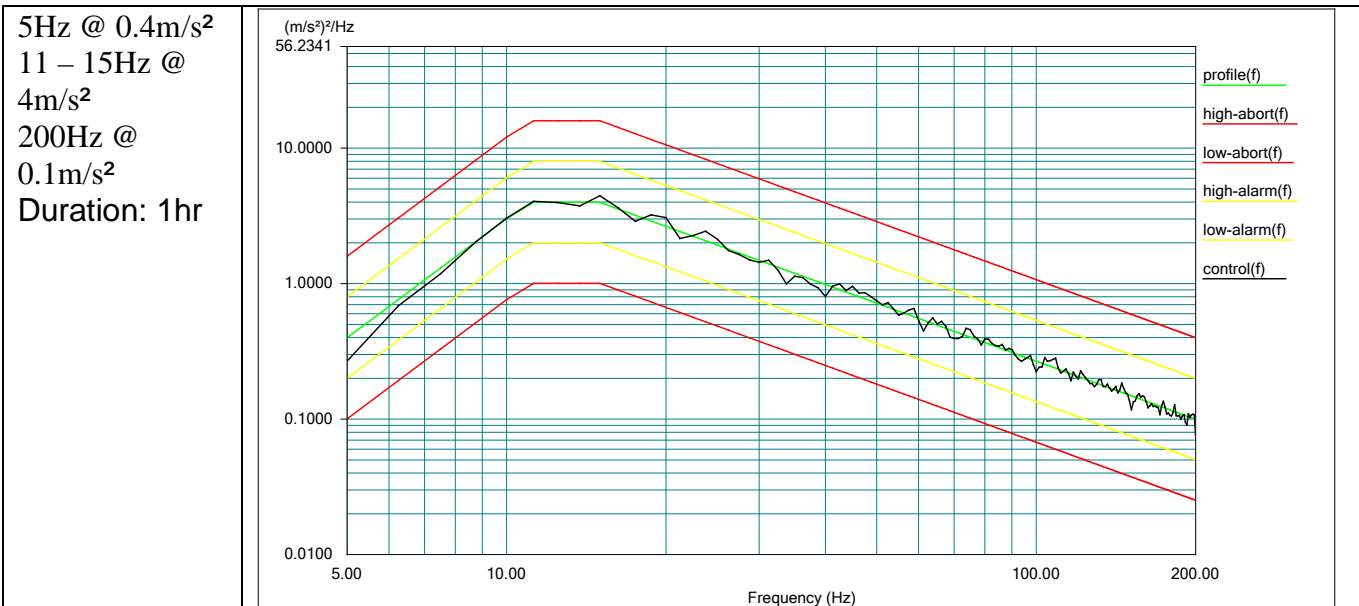


3. Shock: The wave form below is the 15g x 11m/s Positive pulse.



Results: up to 10g all fastens did move but remained in position 15g the buttons popped out

4. Random: Vibration similar to IEC 60068-2 Vertical axis but with a duration of 1Hr



All stored test are included in PDF format along with this report.



## **engineering dynamics**

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DUT: Z Button Fix Plastic

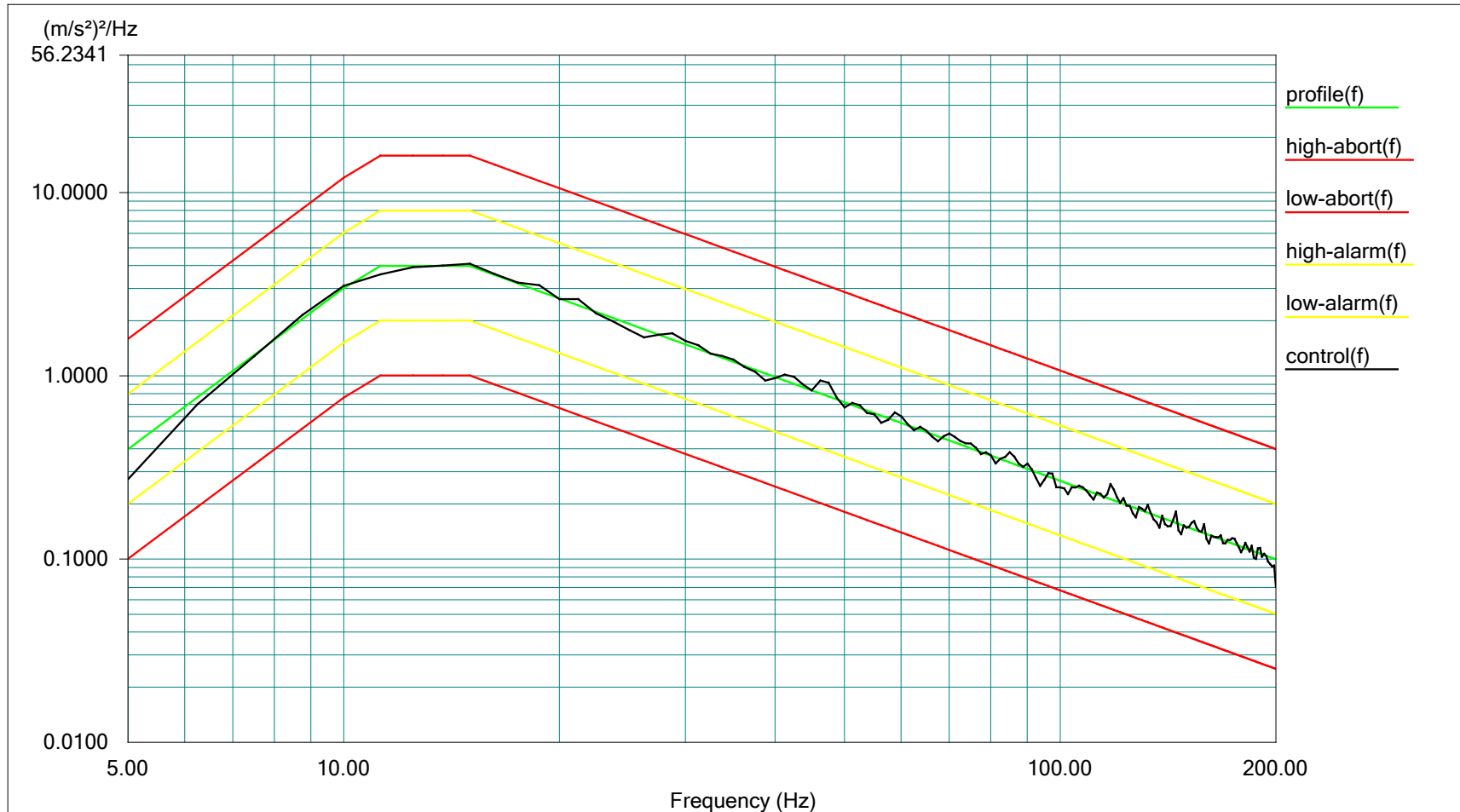
Serial Number:

Project File Name: Vertical life.prj

Profile Name: Vertical life

Test Type: Random

Run Folder: .\RunFolder May 29, 2019 09-29-35



Level: 0 dB

Control RMS: 11.023006 m/s<sup>2</sup> Full Level Elapsed Time: 00:30:00

Demand RMS: 10.990476 m/s<sup>2</sup> Remaining Time: 00:00:00

Lines: 200 Frame Time: 0.800000 Seconds

DOF: 154 dF: 1.250000 Hz

Data saved at 10:03:51 AM, Wednesday, May 29, 2019

Report created at 10:03:53 AM, Wednesday, May 29, 2019

Project File Name: Vertical life.prj

The screenshot displays the 'Shaker Control - Random: Vertical life' software interface. The main window features a menu bar (Project, Test Setup, Profile, Test, Controls, Report, View, Window, Pane, Cursor, Help) and a toolbar with icons for file operations and analysis. The central area is dominated by a graph titled 'Vertical life: Composite' showing acceleration spectral density in  $m/s^2\sqrt{Hz}$  on a logarithmic scale (0.0100 to 56.2341) versus Frequency in Hz (5.00 to 200.00). The graph includes several data series: 'profile(f)' (green), 'high-abort(f)' (red), 'low-abort(f)' (red), 'high-alarm(f)' (yellow), 'low-alarm(f)' (yellow), and 'control(f)' (black). The control signal is shown as a jagged line following the profile. To the left of the graph is a vertical control panel with a scale from -10.00 to 10.00, a 'Shaker' icon, and a 'Channel' icon. Below this, a 'Control' section shows 'Max= 0.31V', 'Min= -0.29V', 'RMS= 0.10V', and 'Peak= 0.31V OK!'. A 'Profile' section shows a clock icon and '12:01'. A 'Schedule' section shows a waveform icon. A 'Transmis' section shows a document icon. A 'Test ID' section has a 'Freeze the stat' checkbox and a table with columns 'Chan#', 'Clipped', and 'Clipp', containing the value '1 No'. At the bottom left, a 'Verti...' window shows 'Content: Full Lev' and a large digital display showing '00:30:00' with the text 'Right click to set'. On the right side of the interface, a control panel displays 'Control RMS' (11.014  $m/s^2$ ) and 'Demand RMS' (10.990  $m/s^2$ ). Below this are 'Level' (0 dB) and 'Drive' (0.404 Volts) settings. A timer section shows 'Full Level Elapsed' (00:30:00), 'Total Elapsed' (00:34:04), and 'Total Remaining' (00:00:00). Control options include 'Auto. Abort Checks' (ON/OFF), 'Closed Loop Control' (ON/OFF), and 'Schedule Clock Timer' (ON/OFF). A status bar shows '8.709 (mn) P-P' and '0.282 (m/s) Pk'. The activity is 'Ramping down...'. A large 'RANDOM' button is present, along with 'Start', 'Stop', 'Pause', and 'Continue' buttons. The status bar at the bottom indicates 'Ready' and 'Data Folder: ..\RunFolder May 29, 2019 09-29 Profile: Vertical life'.

Data saved at 10:03:51 AM, Wednesday, May 29, 2019

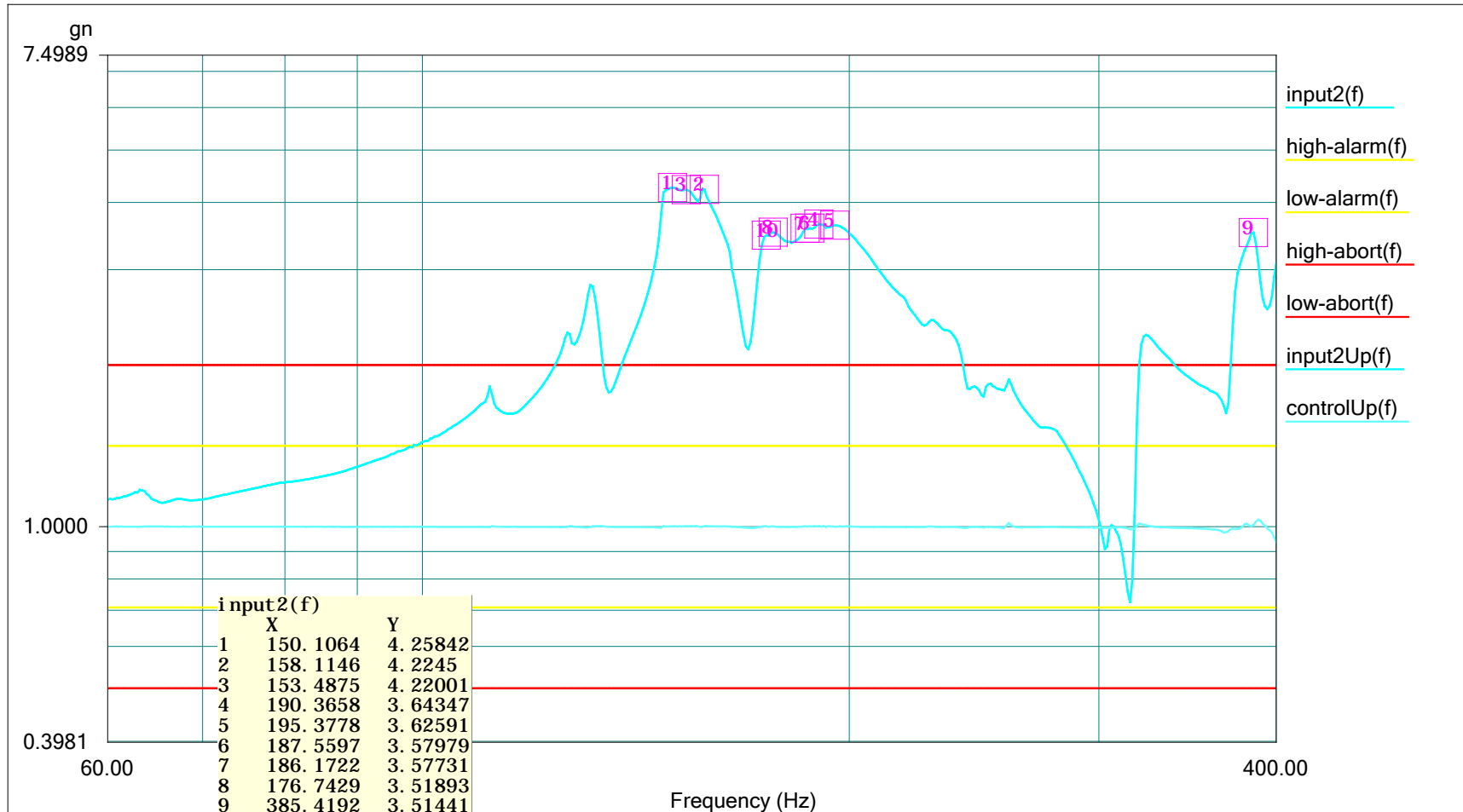
Report created at 10:03:53 AM, Wednesday, May 29, 2019



DUT: Plastic Button Type 1s  
 Serial Number:  
 Project File Name: Untitled  
 Profile Name: Low Level

Test Type: Swept Sine

Run Folder: .\RunDefault May 29, 2019 10-12-26



Level: 100 % Full Level Time: 00:02:44 Sweep Type: Logarithmic  
 Frequency: 399.841339 Hz Time Remaining: 00:00:00 Sweep Rate: 1 Oct/Min

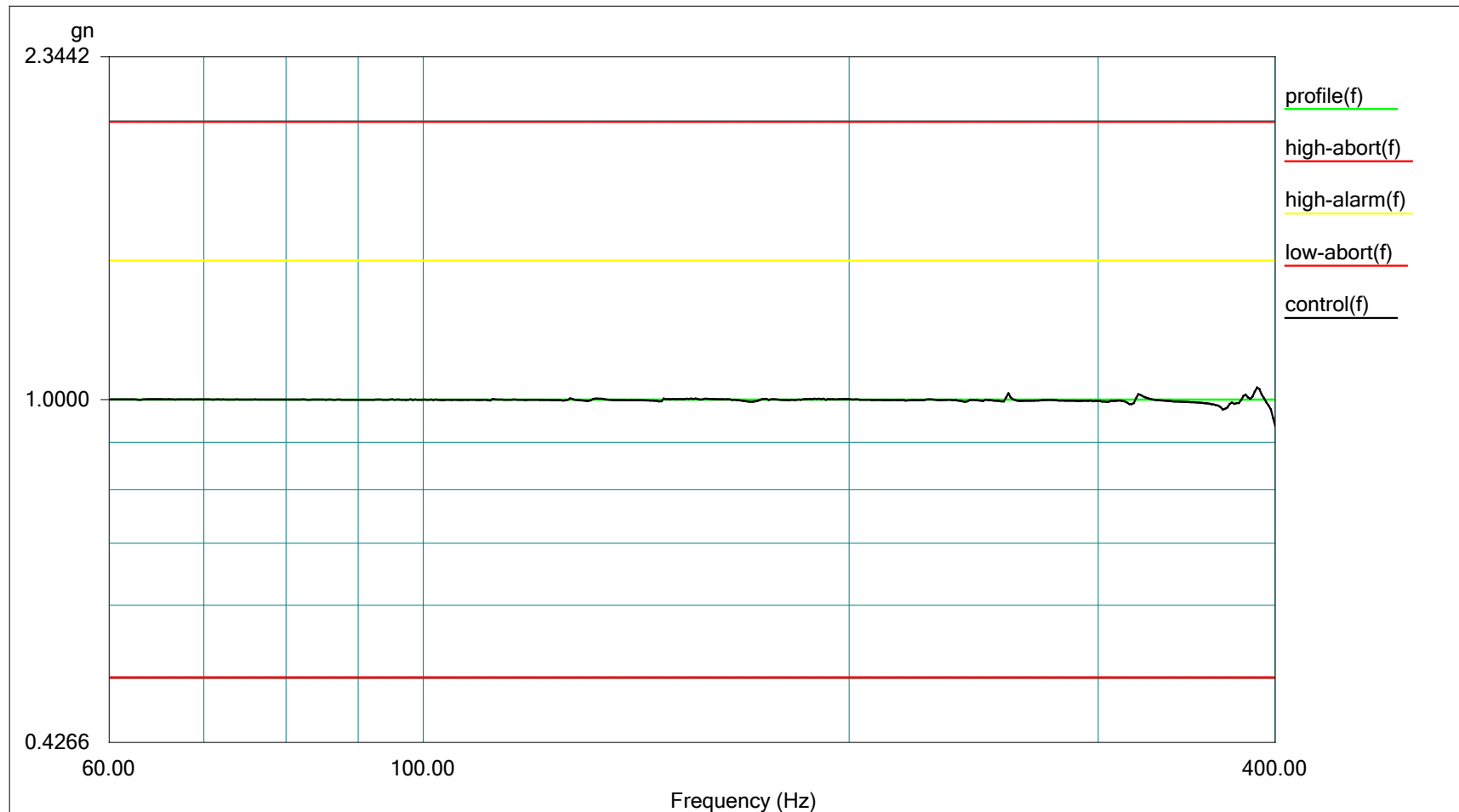
Data saved at 10:15:17 AM, Wednesday, May 29, 2019

Report created at 10:15:18 AM, Wednesday, May 29, 2019

DUT: Plastic Button Type 1s  
Serial Number:  
Project File Name: Untitled  
Profile Name: Low Level

Test Type: Swept Sine

Run Folder: .\RunDefault May 29, 2019 10-12-26



Level: 100 % Full Level Time: 00:02:44 Sweep Type: Logarithmic  
Frequency: 399.841339 Hz Time Remaining: 00:00:00 Sweep Rate: 1 Oct/Min

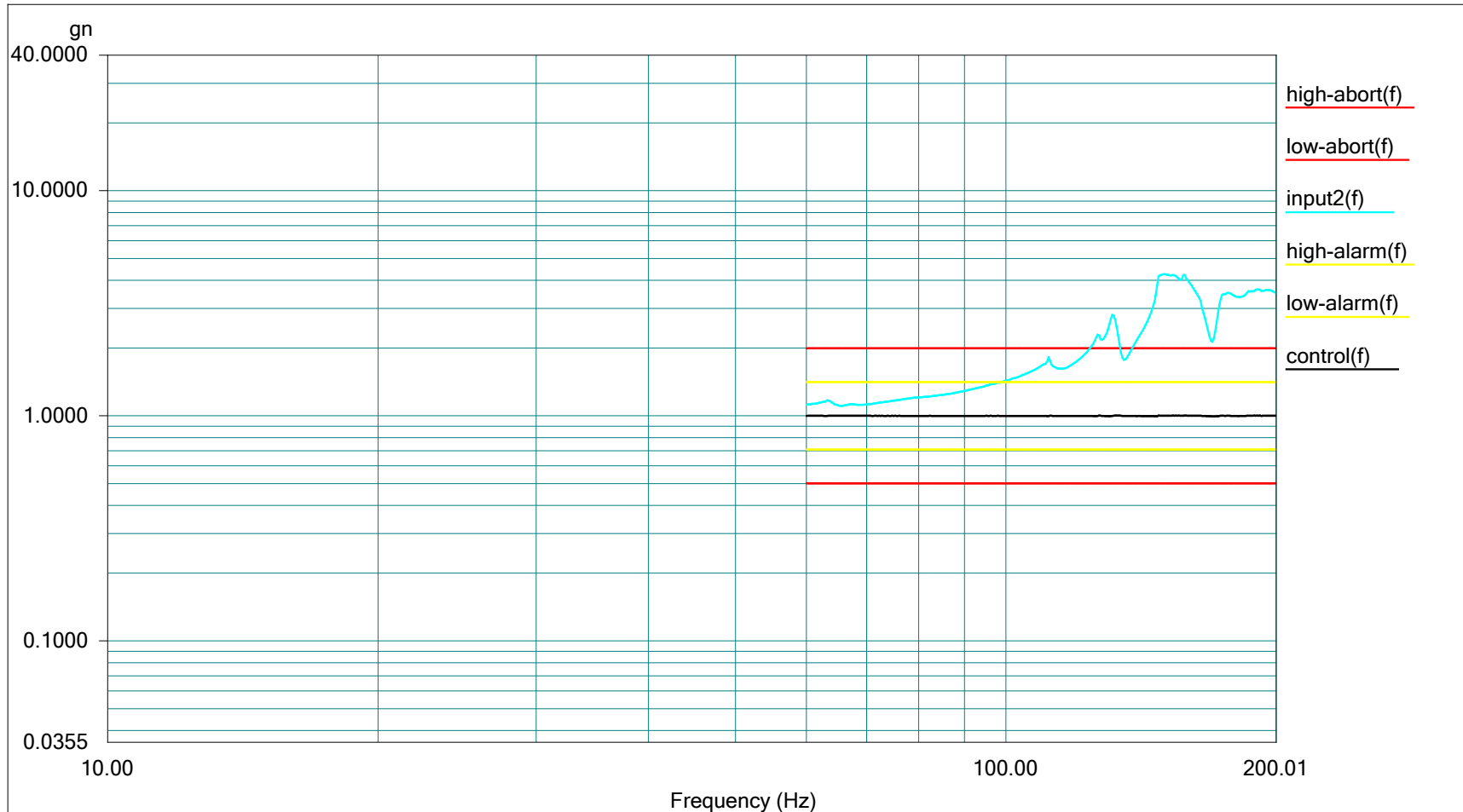
Data saved at 10:15:17 AM, Wednesday, May 29, 2019

Report created at 10:15:18 AM, Wednesday, May 29, 2019

DUT: Plastic Button Type 1s  
Serial Number:  
Project File Name: Untitled  
Profile Name: Low Level

Test Type: Swept Sine

Run Folder: .\RunDefault May 29, 2019 10-12-26

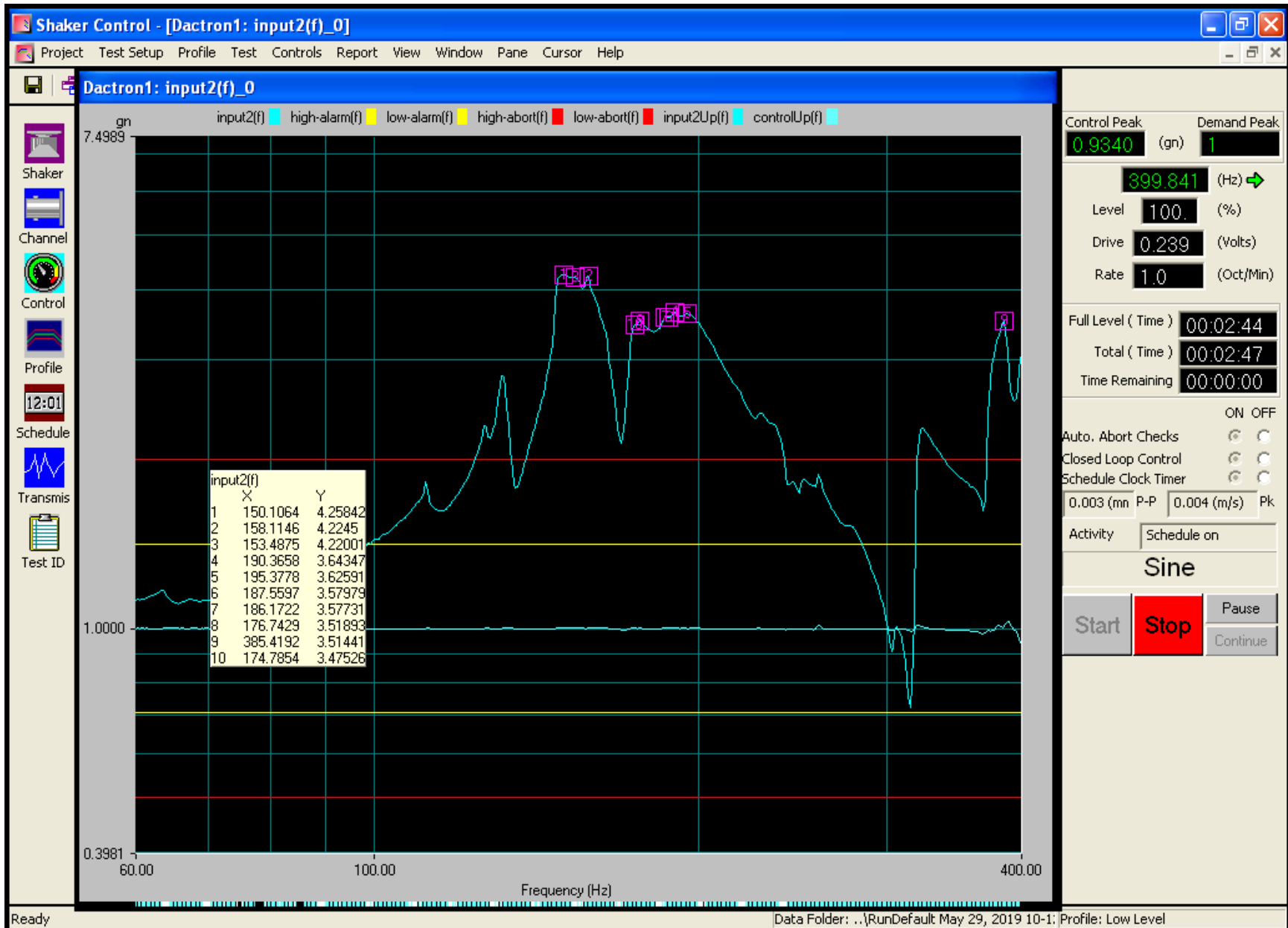


Level: 100 % Full Level Time: 00:02:44 Sweep Type: Logarithmic  
Frequency: 399.841339 Hz Time Remaining: 00:00:00 Sweep Rate: 1 Oct/Min

Data saved at 10:15:17 AM, Wednesday, May 29, 2019

Report created at 10:15:18 AM, Wednesday, May 29, 2019

Project File Name: Untitled



Data saved at 10:15:17 AM, Wednesday, May 29, 2019

Report created at 10:15:19 AM, Wednesday, May 29, 2019

DUT: Plastib Button Fix Type 1s

Serial Number:

Project File Name: Untitled

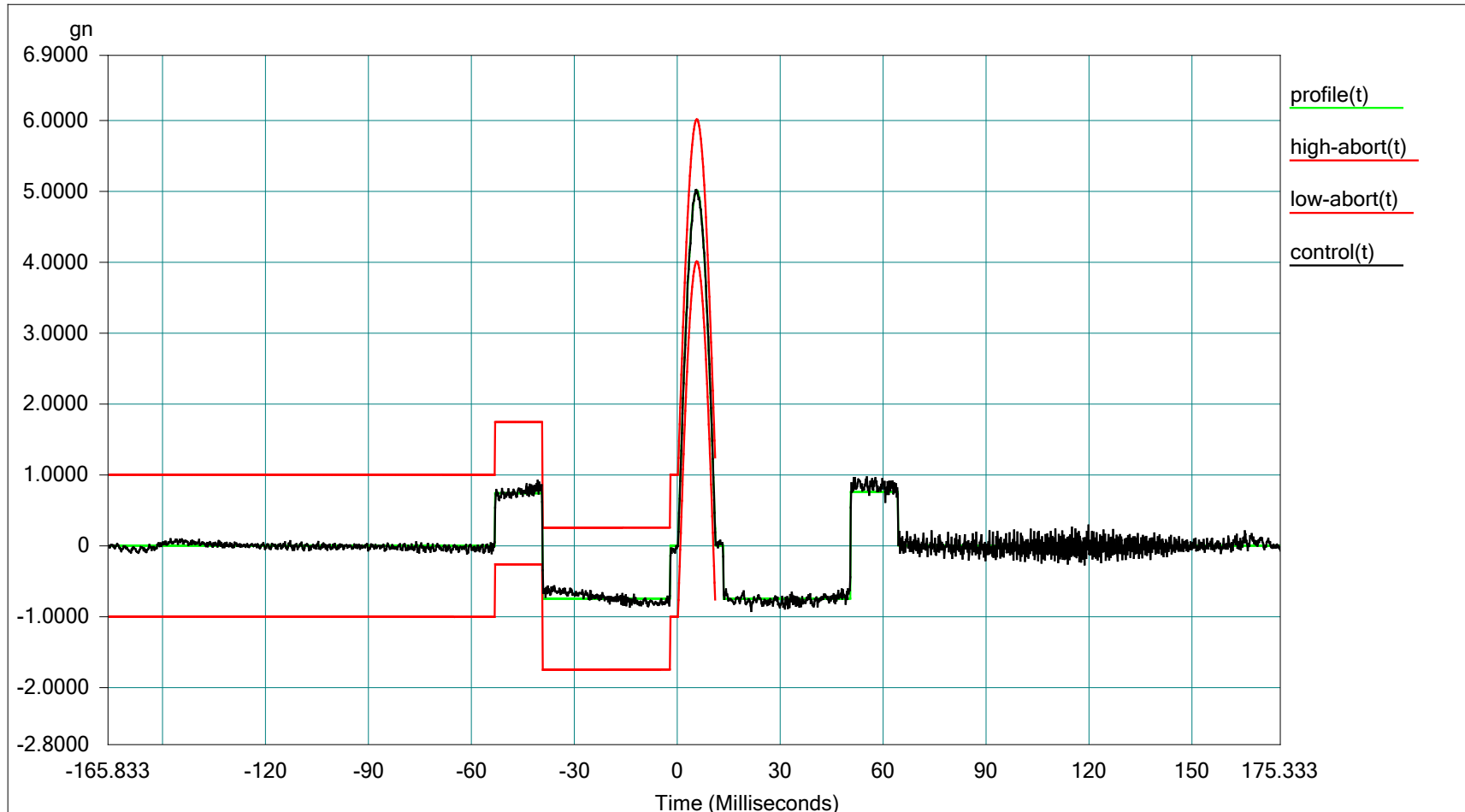
Profile Name: Shock

Test Type:

Classical Shock

Run Folder:

.\RunDefault May 29, 2019 10-35-06



Level: 0 dB

Frame Time: 0.341333 Seconds

dT: 0.000167 Seconds

Pulse Type: Half Sine

Block Size: 2048

Control Peak: 5.006977

Demand Peak: 5.000000

Amplitude: 5.000000

Elapsed Pulses: 15

Control RMS: 0.760598

Demand RMS: 0.754290

Pulse Width: 11.000000 ms

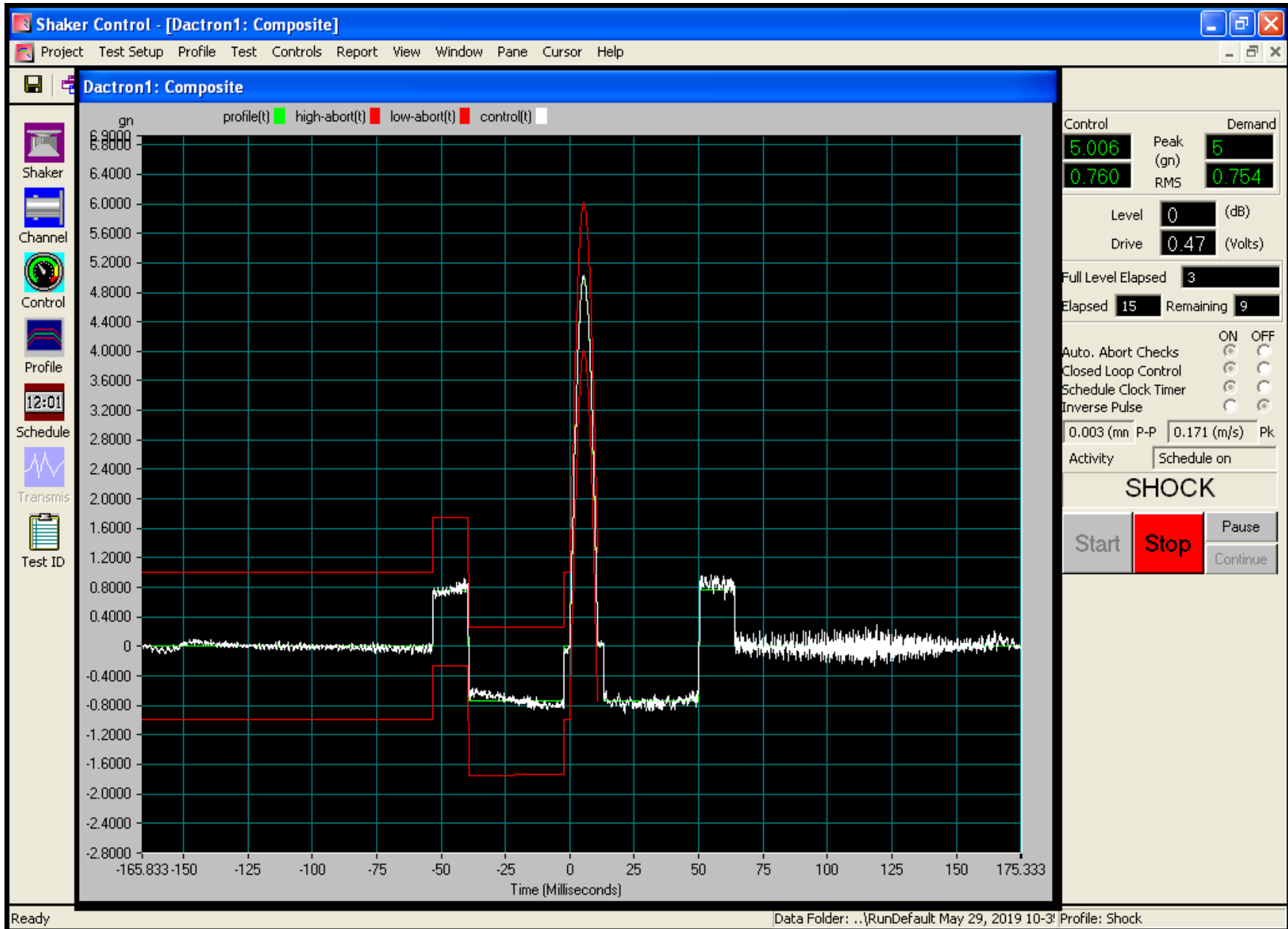
Full Level Elapsed Pulses: 3

Remaining Pulses: 9

Data saved at 10:35:38 AM, Wednesday, May 29, 2019

Report created at 10:35:39 AM, Wednesday, May 29, 2019

Project File Name: Untitled



Data saved at 10:35:38 AM, Wednesday, May 29, 2019

Report created at 10:35:39 AM, Wednesday, May 29, 2019

DUT: Plastib Button Fix Type 1s

Serial Number:

Project File Name: Untitled

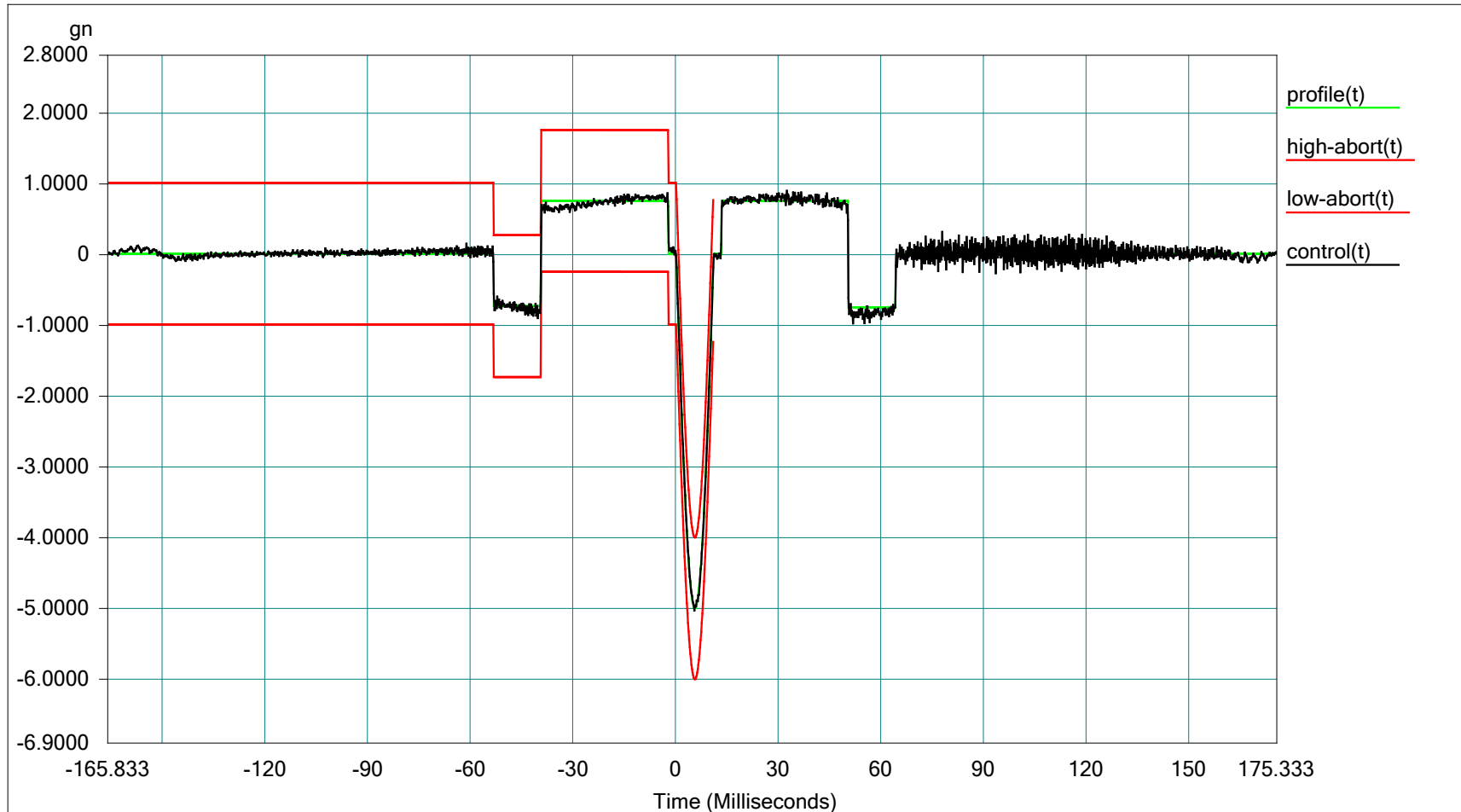
Profile Name: Shock

Test Type:

Classical Shock

Run Folder:

.\RunDefault May 29, 2019 10-35-06



Level: 0 dB

Frame Time: 0.341333 Seconds

dT: 0.000167 Seconds

Pulse Type: Half Sine

Block Size: 2048

Control Peak: 5.030594

Demand Peak: 5.000000

Amplitude: 5.000000

Elapsed Pulses: 24

Control RMS: 0.760941

Demand RMS: 0.754290

Pulse Width: 11.000000 ms

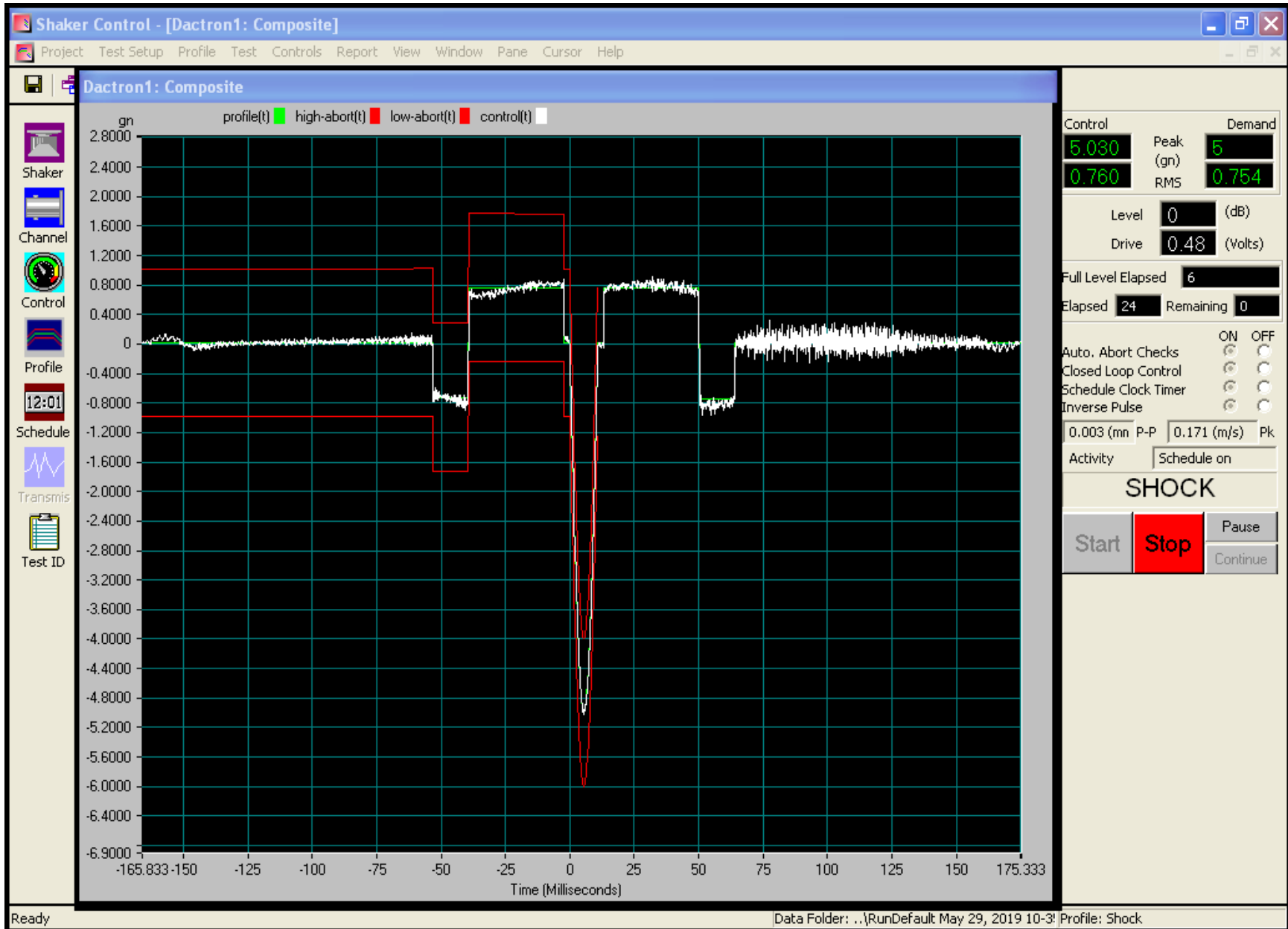
Full Level Elapsed Pulses: 6

Remaining Pulses: 0

Data saved at 10:35:56 AM, Wednesday, May 29, 2019

Report created at 10:35:57 AM, Wednesday, May 29, 2019

Project File Name: Untitled



Data saved at 10:35:56 AM, Wednesday, May 29, 2019

Report created at 10:35:57 AM, Wednesday, May 29, 2019



DUT: Plastib Button Fix Type 1s

Serial Number:

Project File Name: Untitled

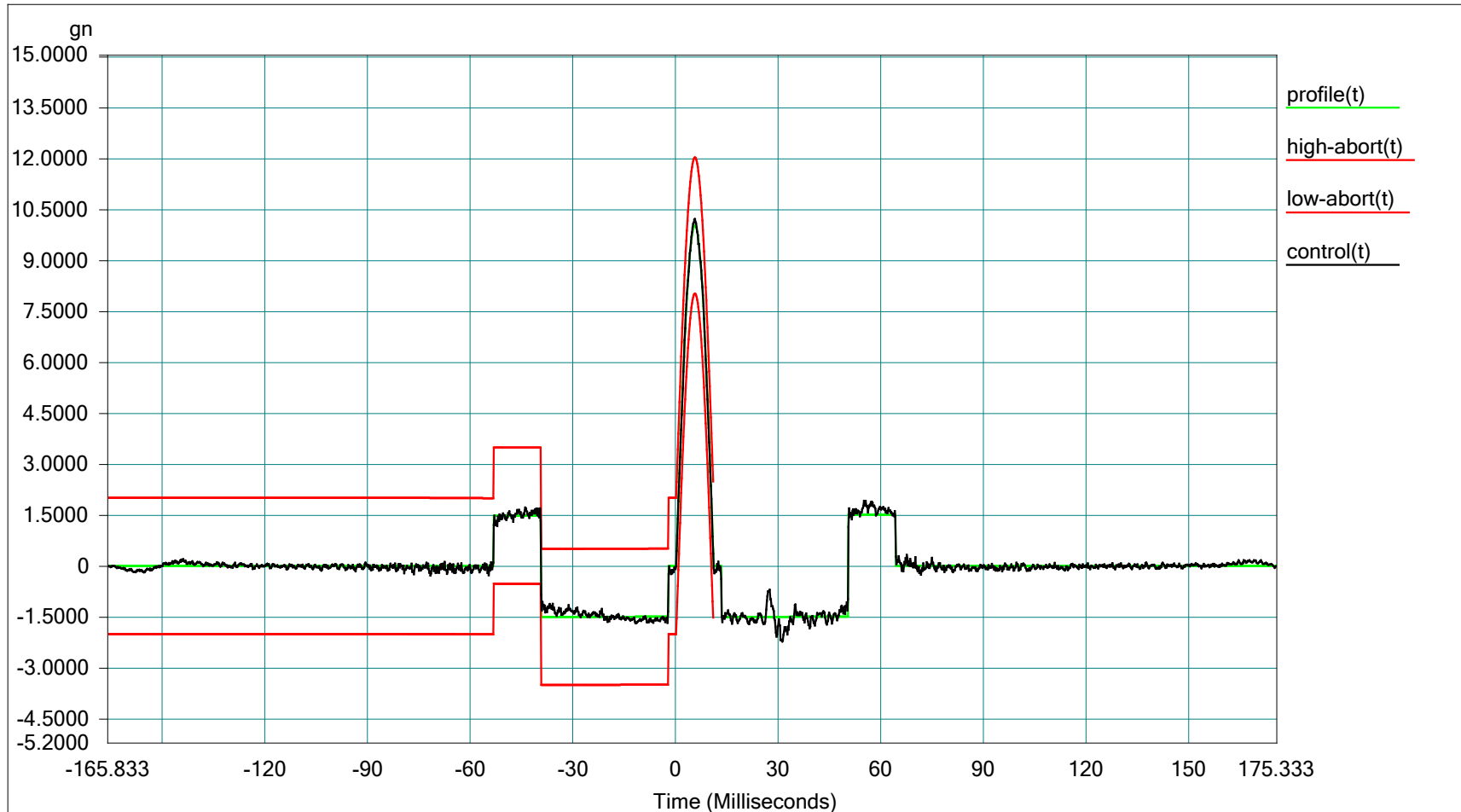
Profile Name: Shock

Test Type:

Classical Shock

Run Folder:

.\RunDefault May 29, 2019 10-37-53



Level: 0 dB

Block Size: 2048

Elapsed Pulses: 16

Frame Time: 0.341333 Seconds

Control Peak: 10.192601

Control RMS: 1.519222

Full Level Elapsed Pulses: 3

dT: 0.000167 Seconds

Demand Peak: 10.000000

Demand RMS: 1.508581

Remaining Pulses: 9

Pulse Type: Half Sine

Amplitude: 10.000000

Pulse Width: 11.000000 ms

Data saved at 10:38:28 AM, Wednesday, May 29, 2019

Report created at 10:38:29 AM, Wednesday, May 29, 2019

Project File Name: Untitled

**Shaker Control - [Dactron1: Composite]**

Project Test Setup Profile Test Controls Report View Window Pane Cursor Help

**Dactron1: Composite**

gn profile(t) high-abort(t) low-abort(t) control(t)

Control Demand  
10.19 Peak (gn) 10  
1.519 RMS 1.508

Level 0 (dB)  
Drive 0.98 (Volts)

Full Level Elapsed 3  
Elapsed 16 Remaining 9

Auto. Abort Checks  ON  OFF  
Closed Loop Control  ON  OFF  
Schedule Clock Timer  ON  OFF  
Inverse Pulse  ON  OFF

0.006 (mn) P-P 0.341 (m/s) Pk

Activity Schedule on

**SHOCK**

Start Stop Pause Continue

Ready Data Folder: ..\RunDefault May 29, 2019 10-3 Profile: Shock

Data saved at 10:38:28 AM, Wednesday, May 29, 2019

Report created at 10:38:29 AM, Wednesday, May 29, 2019

DUT: Plastib Button Fix Type 1s

Serial Number:

Project File Name: Untitled

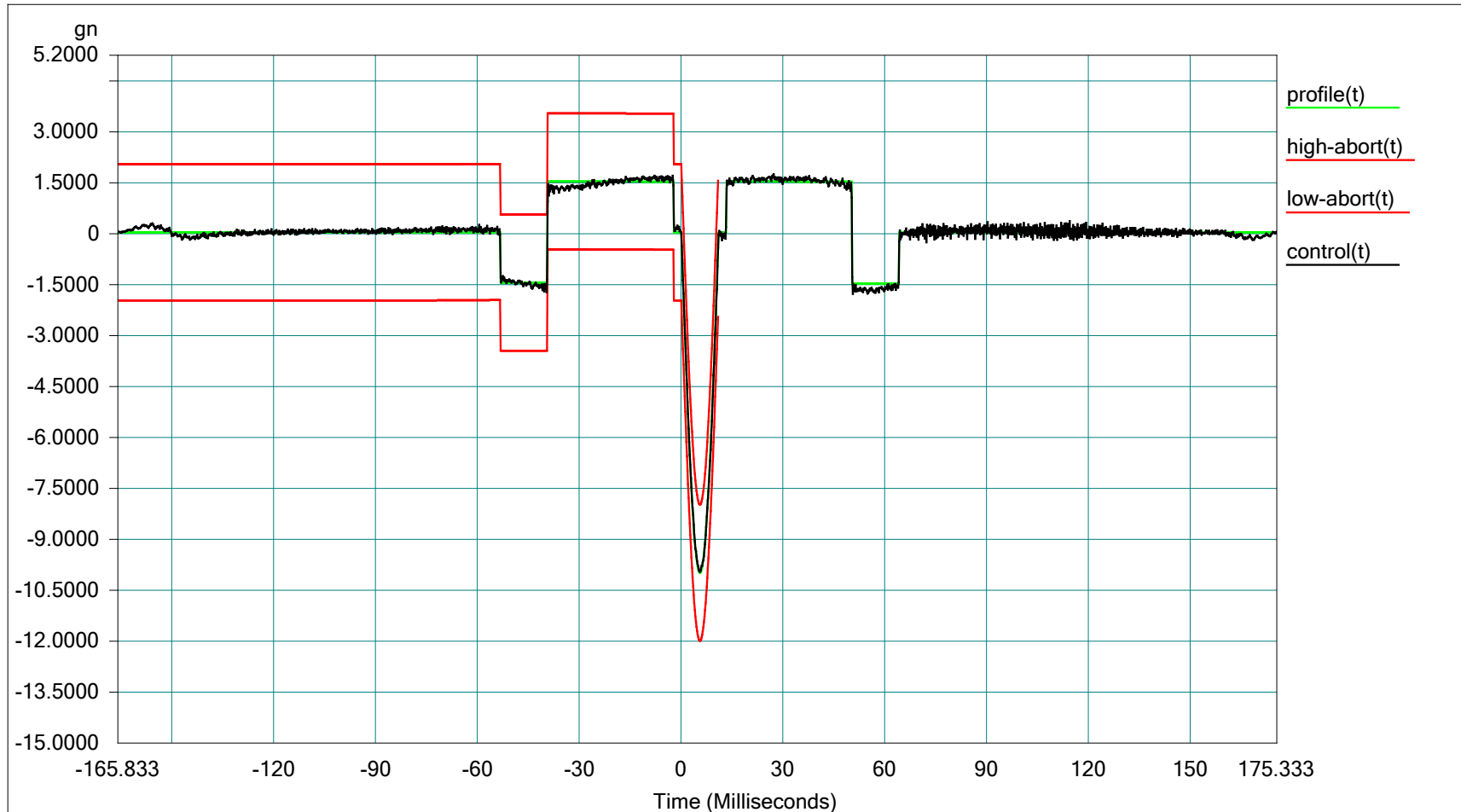
Profile Name: Shock

Test Type:

Classical Shock

Run Folder:

.\RunDefault May 29, 2019 10-37-53



Level: 0 dB

Frame Time: 0.341333 Seconds

dT: 0.000167 Seconds

Pulse Type: Half Sine

Block Size: 2048

Control Peak: 9.971583

Demand Peak: 10.000000

Amplitude: 10.000000

Elapsed Pulses: 25

Control RMS: 1.516868

Demand RMS: 1.508581

Pulse Width: 11.000000 ms

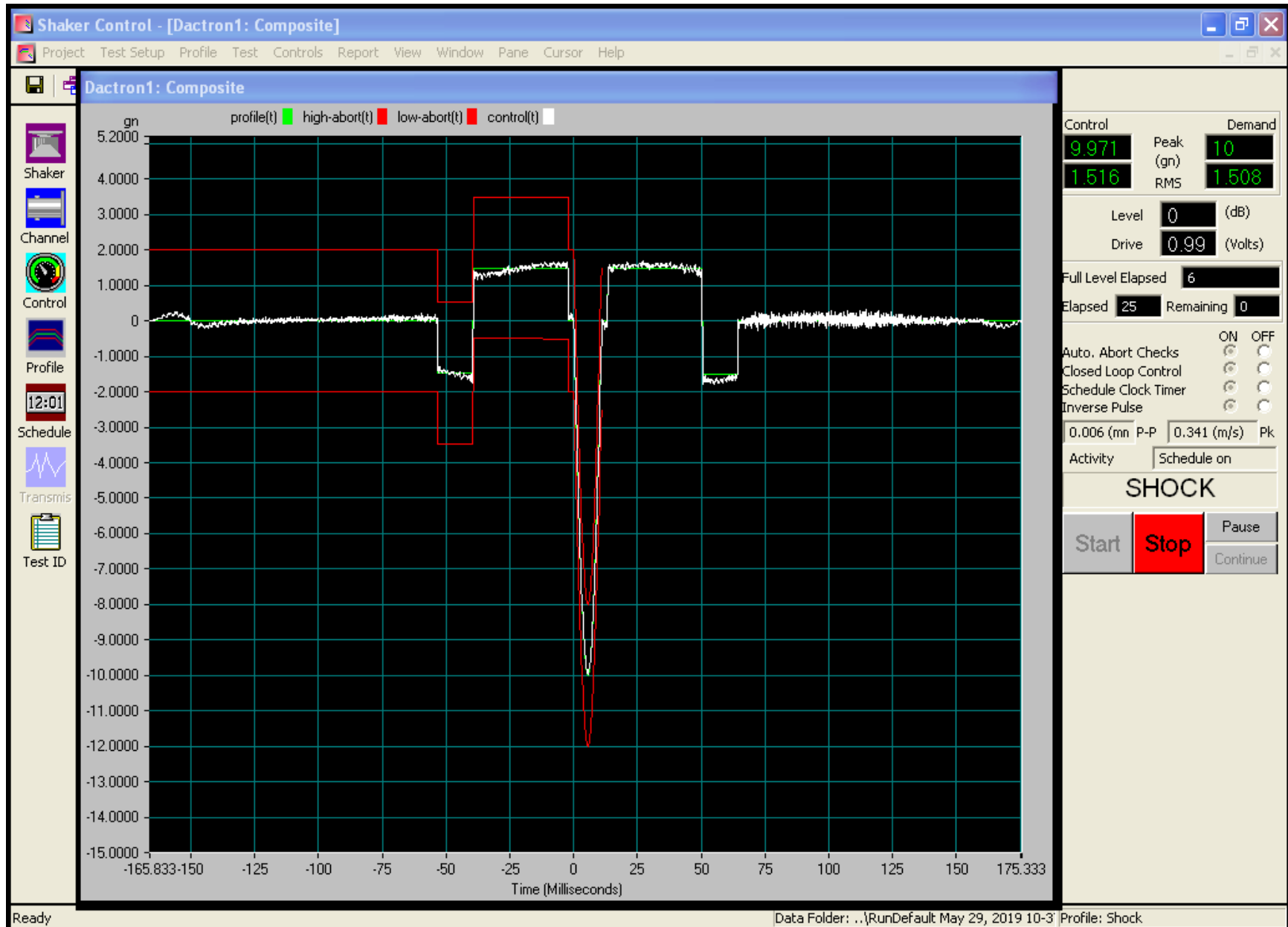
Full Level Elapsed Pulses: 6

Remaining Pulses: 0

Data saved at 10:38:46 AM, Wednesday, May 29, 2019

Report created at 10:38:46 AM, Wednesday, May 29, 2019

Project File Name: Untitled



Data saved at 10:38:46 AM, Wednesday, May 29, 2019

Report created at 10:38:47 AM, Wednesday, May 29, 2019

DUT: Plastib Button Fix Type 1s

Serial Number:

Project File Name: Untitled

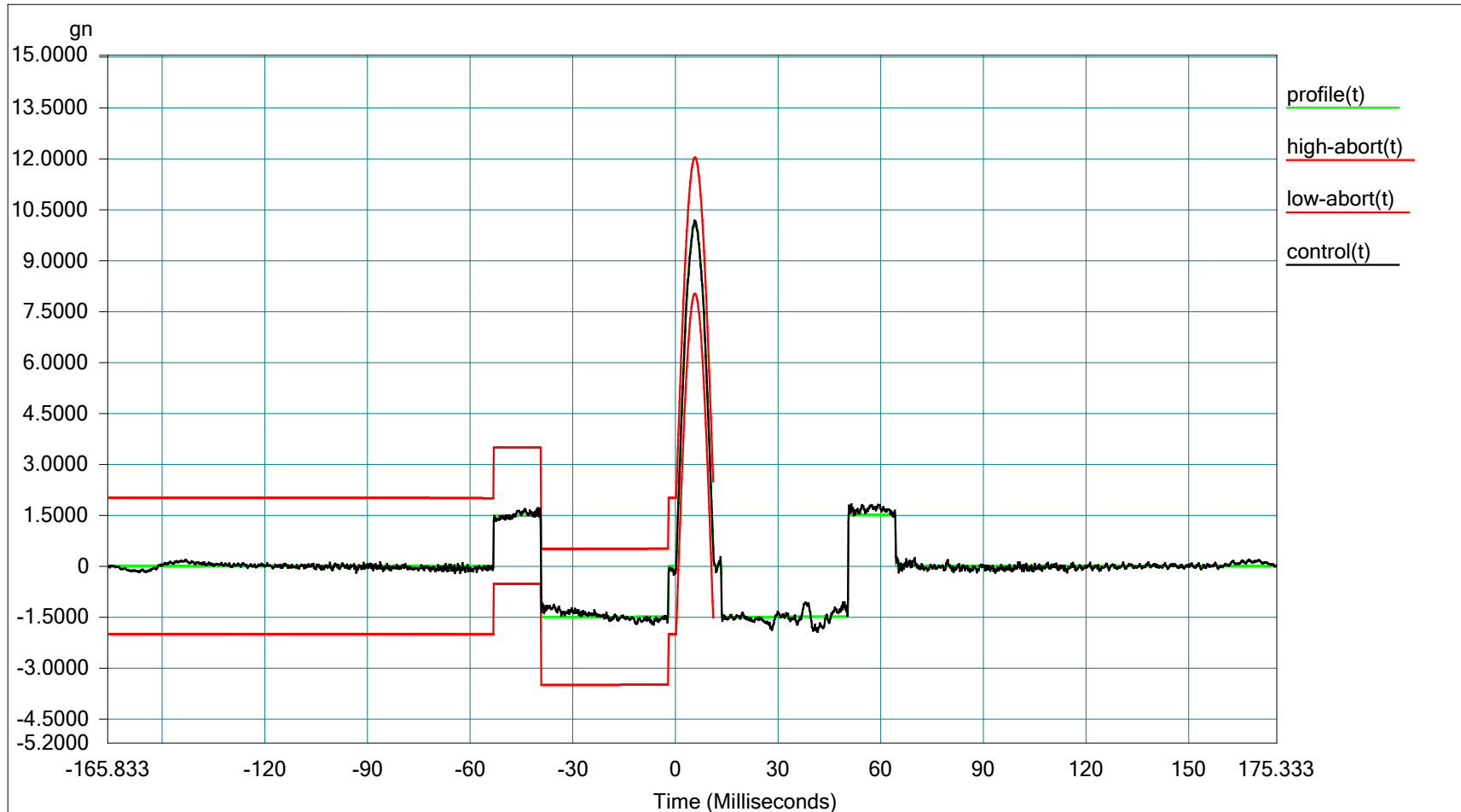
Profile Name: Shock

Test Type:

Classical Shock

Run Folder:

.\RunDefault May 29, 2019 10-43-56



Level: 0 dB

Block Size: 2048

Elapsed Pulses: 16

Frame Time: 0.341333 Seconds

Control Peak: 10.145705

Control RMS: 1.518330

Full Level Elapsed Pulses: 3

dT: 0.000167 Seconds

Demand Peak: 10.000000

Demand RMS: 1.508581

Remaining Pulses: 9

Pulse Type: Half Sine

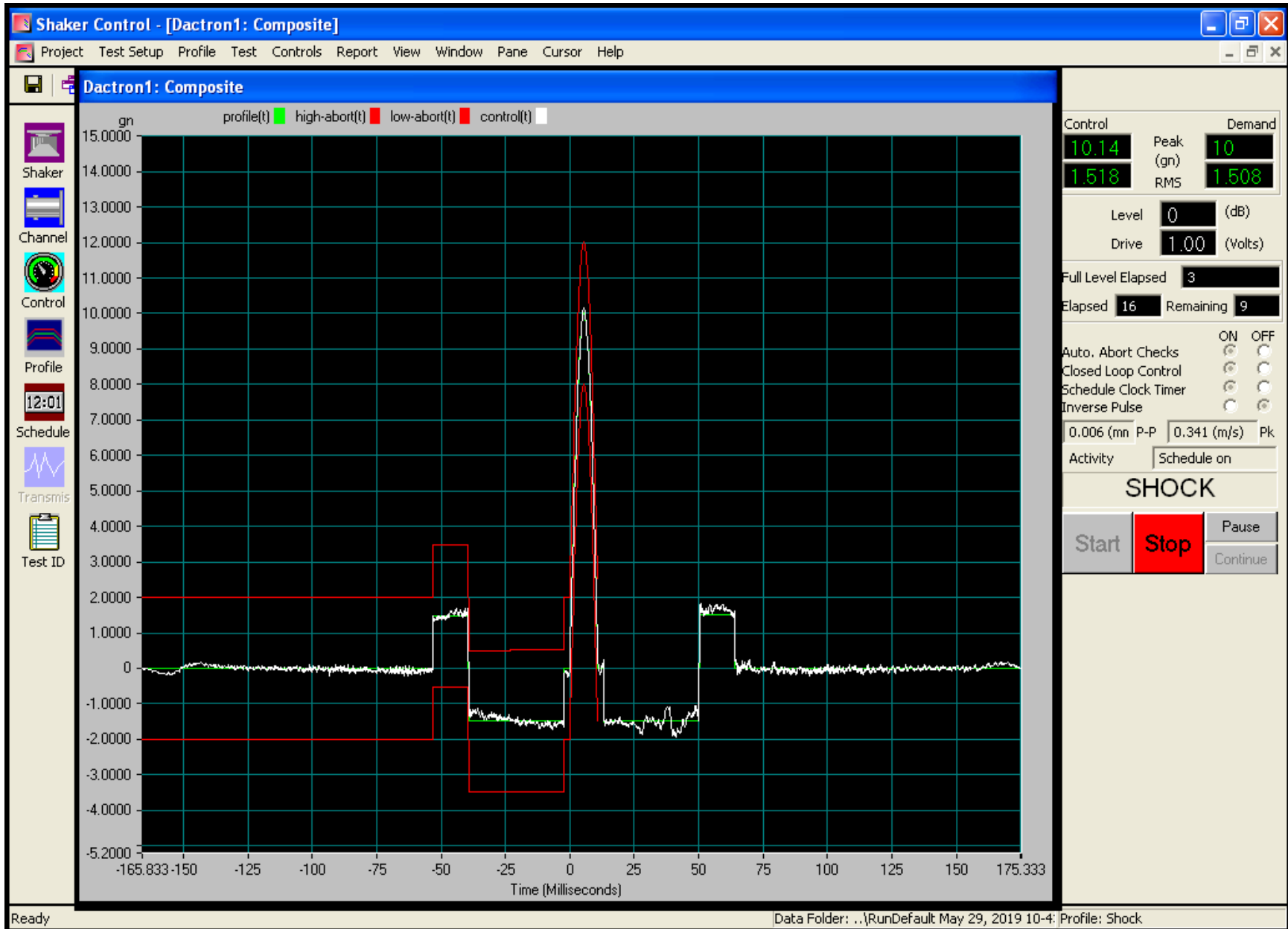
Amplitude: 10.000000

Pulse Width: 11.000000 ms

Data saved at 10:44:29 AM, Wednesday, May 29, 2019

Report created at 10:44:30 AM, Wednesday, May 29, 2019

Project File Name: Untitled



Data saved at 10:44:29 AM, Wednesday, May 29, 2019

Report created at 10:44:30 AM, Wednesday, May 29, 2019

DUT: Plastib Button Fix Type 1s

Serial Number:

Project File Name: Untitled

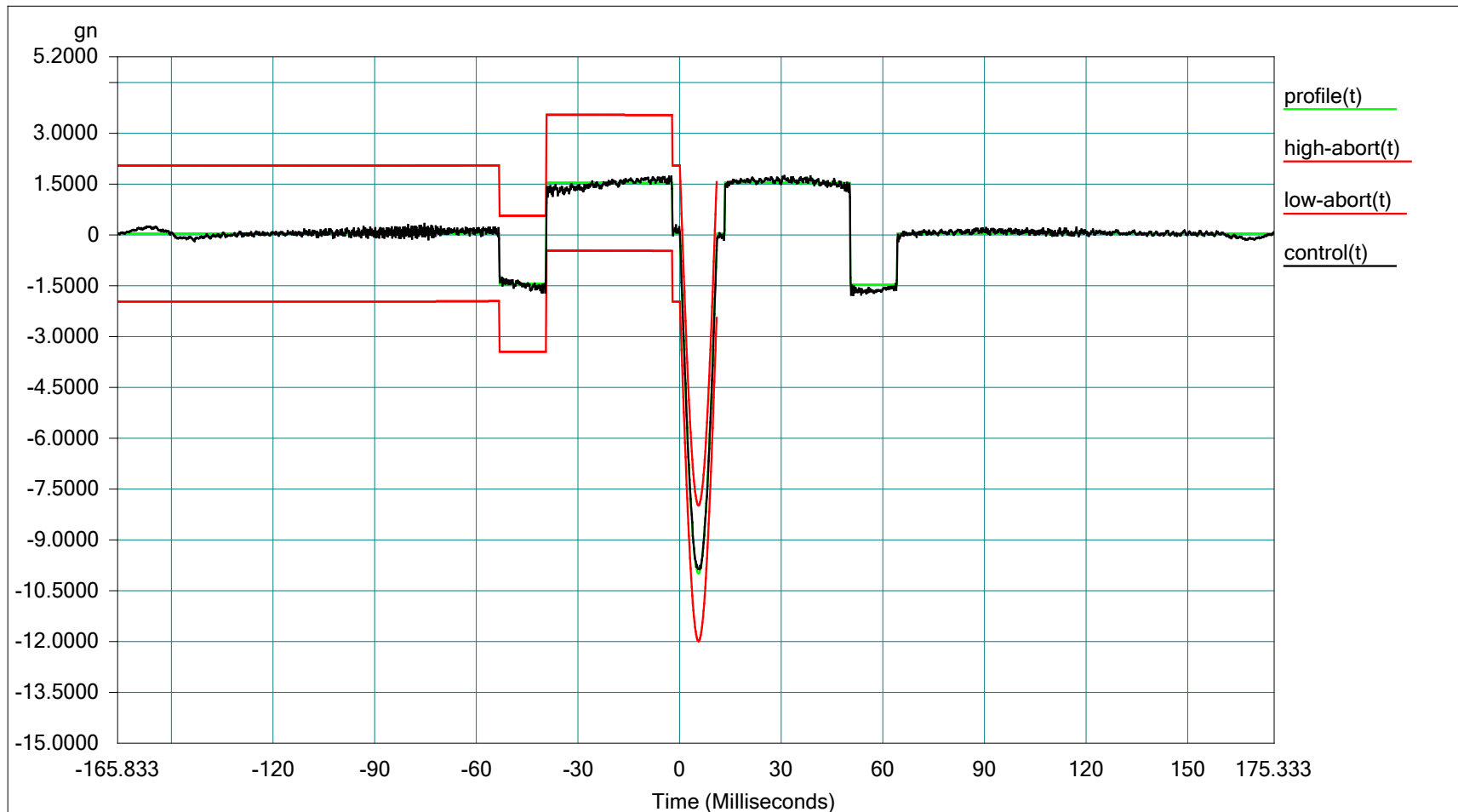
Profile Name: Shock

Test Type:

Classical Shock

Run Folder:

.\RunDefault May 29, 2019 10-43-56



Level: 0 dB

Frame Time: 0.341333 Seconds

dT: 0.000167 Seconds

Pulse Type: Half Sine

Block Size: 2048

Control Peak: 9.879782

Demand Peak: 10.000000

Amplitude: 10.000000

Elapsed Pulses: 25

Control RMS: 1.516252

Demand RMS: 1.508581

Pulse Width: 11.000000 ms

Full Level Elapsed Pulses: 6

Remaining Pulses: 0

Data saved at 10:44:47 AM, Wednesday, May 29, 2019

Report created at 10:44:48 AM, Wednesday, May 29, 2019

Project File Name: Untitled



Data saved at 10:44:47 AM, Wednesday, May 29, 2019

Report created at 10:44:48 AM, Wednesday, May 29, 2019



DUT: Plastib Button Fix Type 1s

Serial Number:

Project File Name: Untitled

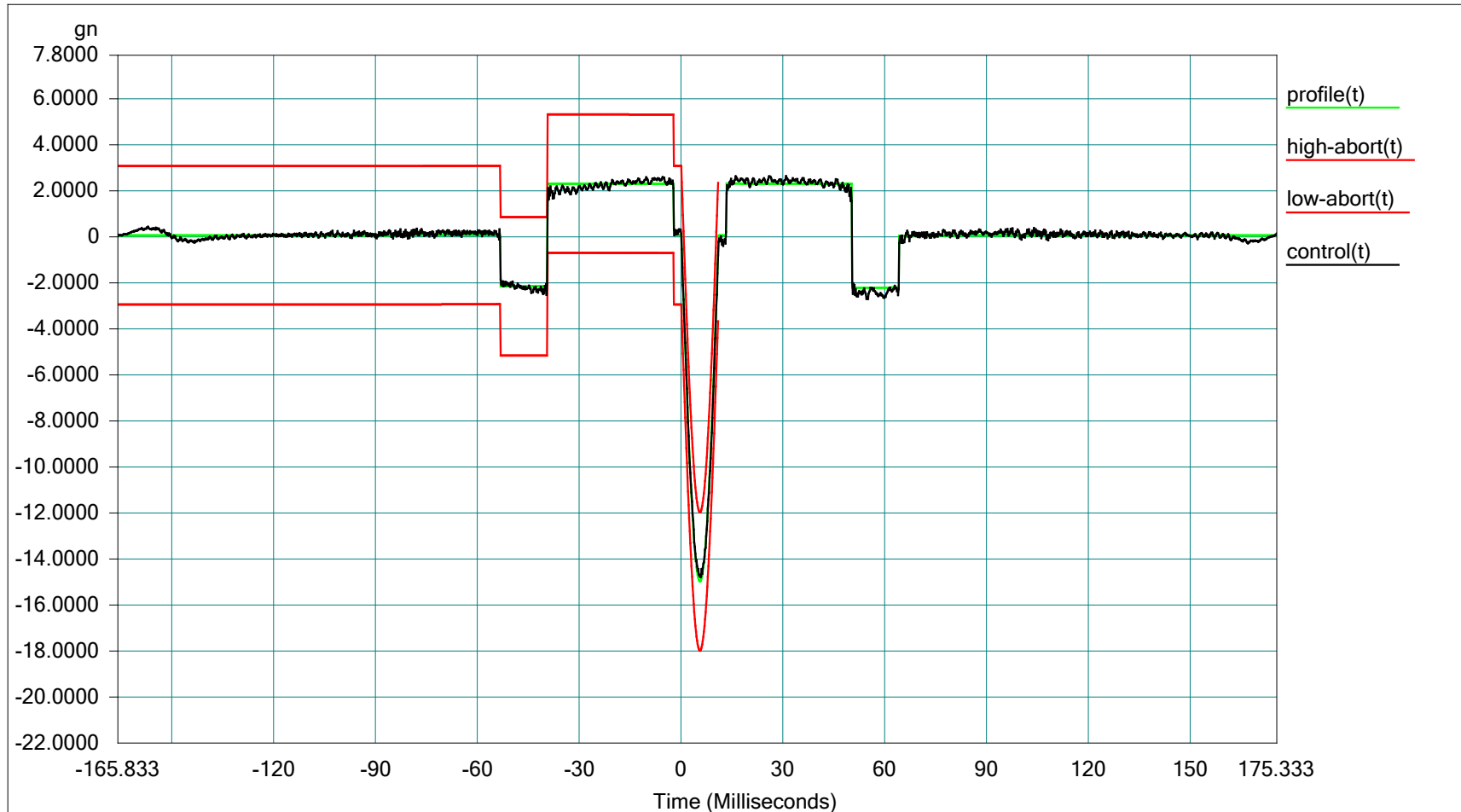
Profile Name: Shock

Test Type:

Classical Shock

Run Folder:

.\RunDefault May 29, 2019 10-39-30



Level: 0 dB

Block Size: 2048

Elapsed Pulses: 26

Frame Time: 0.341333 Seconds

Control Peak: 14.815354

Control RMS: 2.269749

Full Level Elapsed Pulses: 6

dT: 0.000167 Seconds

Demand Peak: 14.999999

Demand RMS: 2.262871

Remaining Pulses: 0

Pulse Type: Half Sine

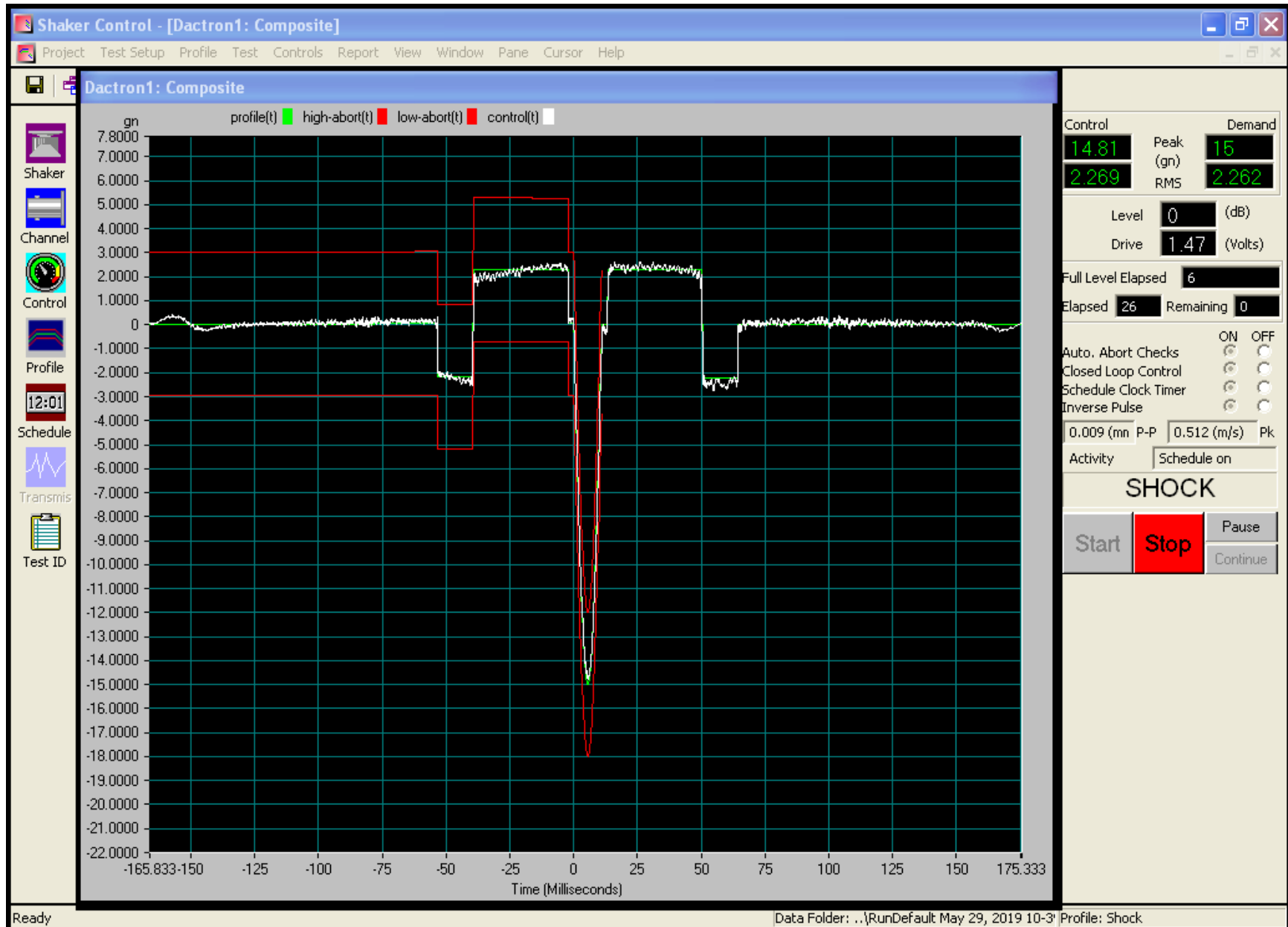
Amplitude: 14.999999

Pulse Width: 11.000000 ms

Data saved at 10:40:26 AM, Wednesday, May 29, 2019

Report created at 10:40:27 AM, Wednesday, May 29, 2019

Project File Name: Untitled



Data saved at 10:40:26 AM, Wednesday, May 29, 2019

Report created at 10:40:27 AM, Wednesday, May 29, 2019

DUT: Plastib Button Fix Type 1s

Serial Number:

Project File Name: Untitled

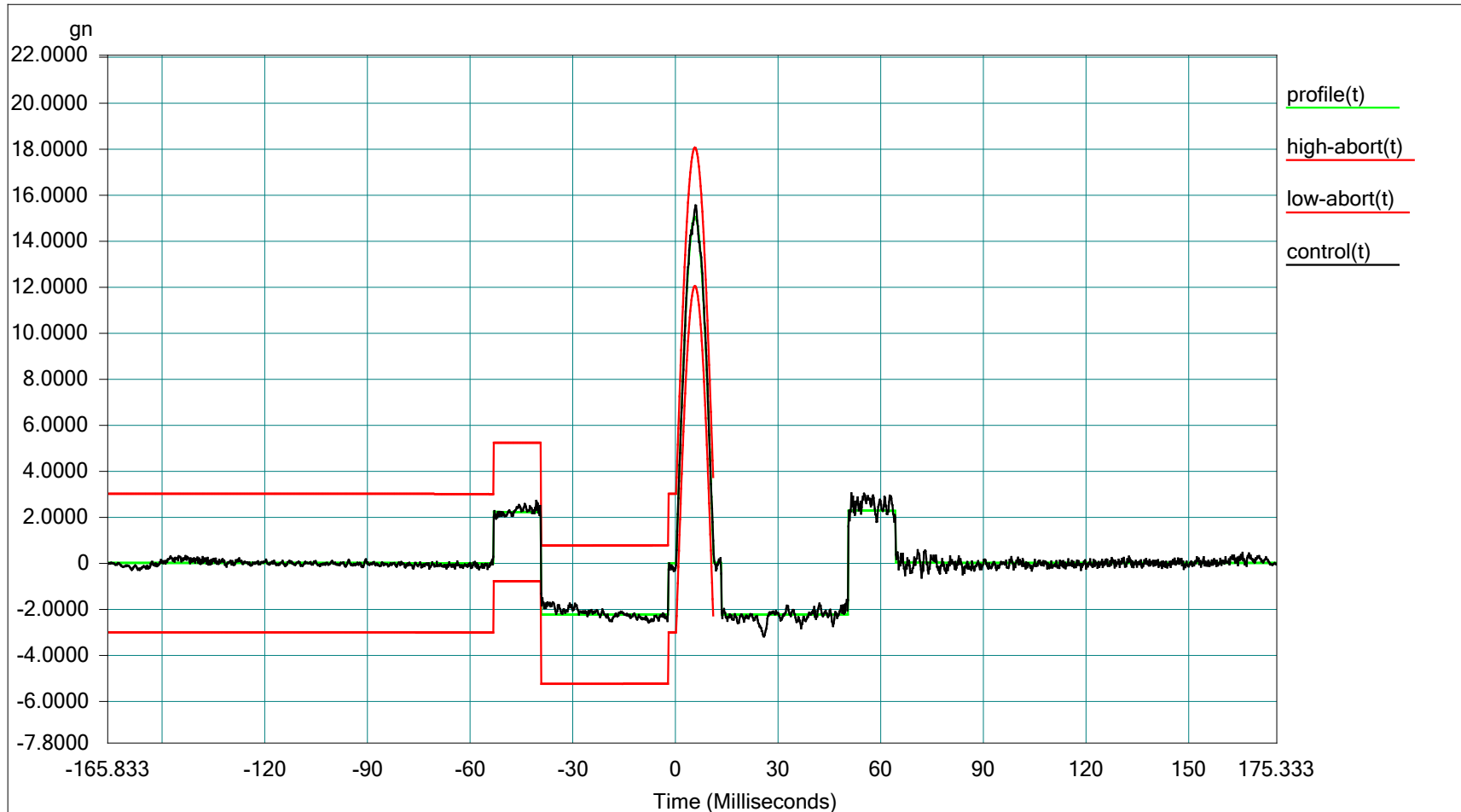
Profile Name: Shock

Test Type:

Classical Shock

Run Folder:

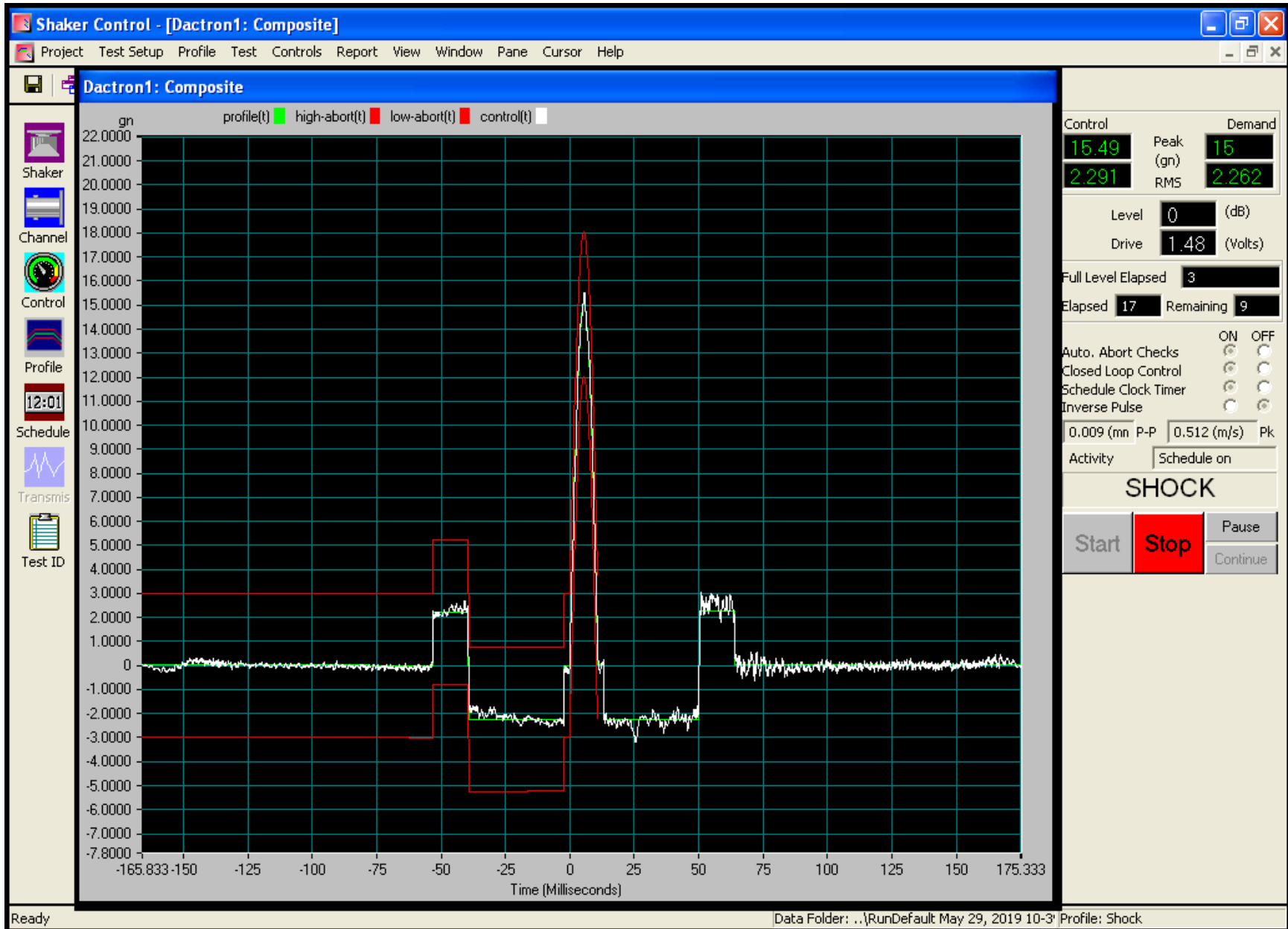
.\RunDefault May 29, 2019 10-39-30



Level:	0 dB	Block Size:	2048	Elapsed Pulses:	17		
Frame Time:	0.341333 Seconds	Control Peak:	15.493822	Control RMS:	2.291686	Full Level Elapsed Pulses:	3
dT:	0.000167 Seconds	Demand Peak:	14.999999	Demand RMS:	2.262871	Remaining Pulses:	9
Pulse Type:	Half Sine	Amplitude:	14.999999	Pulse Width:	11.000000 ms		

Data saved at 10:40:08 AM, Wednesday, May 29, 2019      Report created at 10:40:09 AM, Wednesday, May 29, 2019

Project File Name: Untitled



Data saved at 10:40:08 AM, Wednesday, May 29, 2019

Report created at 10:40:09 AM, Wednesday, May 29, 2019

DUT: Z Button Fix Type 1s plastic

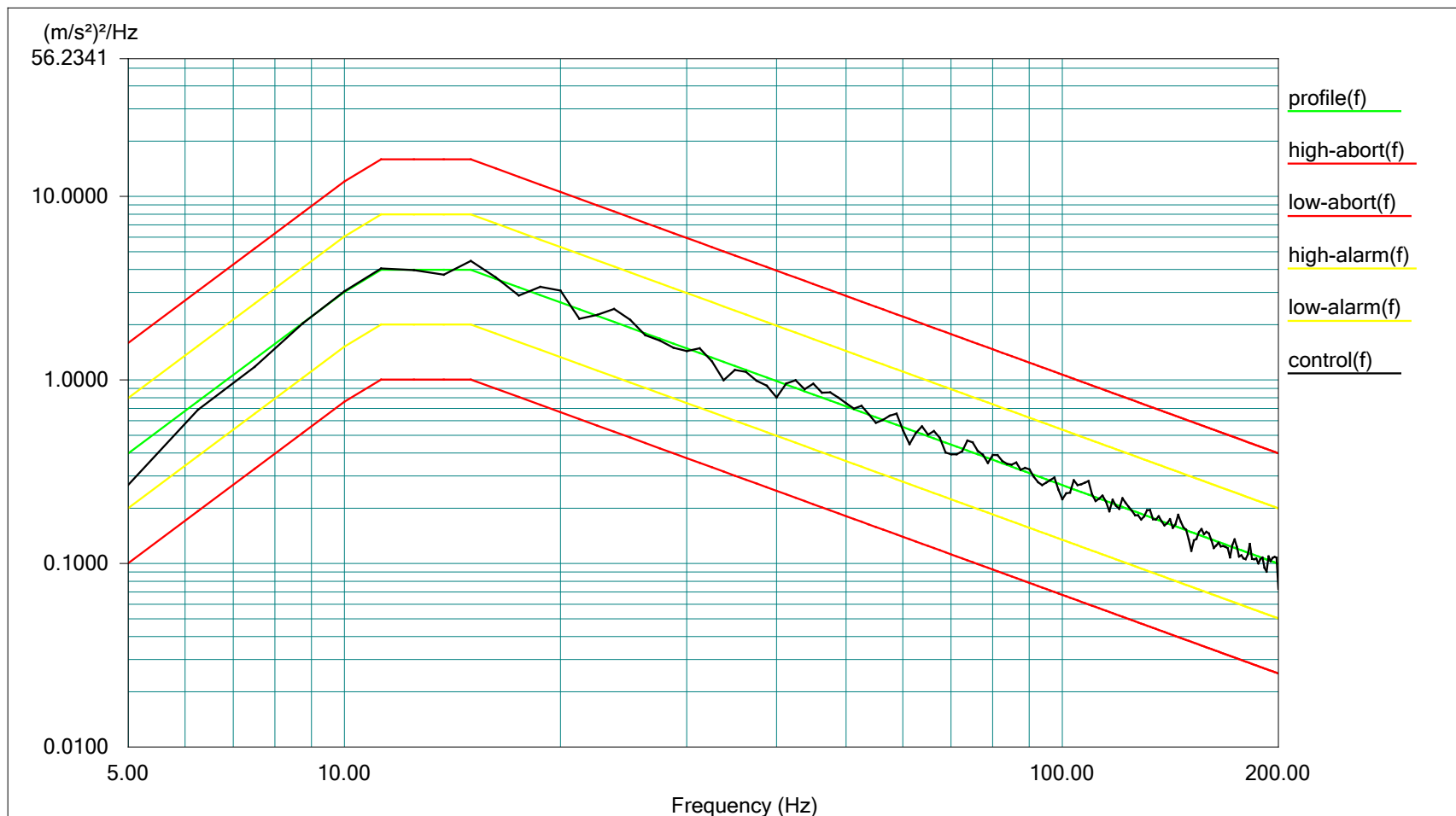
Serial Number:

Project File Name: Vertical life.prj

Profile Name: Vertical life

Test Type: Random

Run Folder: .\RunFolder May 29, 2019 10-50-39



Level: 0 dB

Control RMS: 11.028497 m/s<sup>2</sup> Full Level Elapsed Time: 01:00:00

Demand RMS: 10.990476 m/s<sup>2</sup> Remaining Time: 00:00:00

Lines: 200 Frame Time: 0.800000 Seconds

DOF: 154 dF: 1.250000 Hz

Data saved at 11:54:39 AM, Wednesday, May 29, 2019

Report created at 11:54:40 AM, Wednesday, May 29, 2019

