



Product Service

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Technical Report No.

713189964 Rev.2

dated

13.08.2020

Client: nVent, Schroff GmbH
Langenalber Straße 96-100

75334 Straubenhardt

Manufacturer and / or
location of
manufacturing: see client

Unit under test
(UUT): 1x Schroff IP-Pro Case

Test specification: Test specification: DIN EN 61373: 2011 - Category 2
AREMA Class I

The relevant tests required in the above specification were carried out according to the following listed standards:

Vibration test to DIN EN 60068-2-6: 2008
Vibration test to DIN EN 60068-2-64: 2009
Shock test to DIN EN 60068-2-27: 2010

Test scope: Verification of suitability for intended application according the under position 3 detailed test specification.

Test result: The unit under test was not opened. The visual inspection showed no deficiencies or damages (see notes position 5 - test sequence).

Test software - BurnInTest V8.1 Pro from PASSMARK (which was provided by the customer) ran during the tests. No software misbehaviour was found during and after the tests.

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1 Unit under test (UUT)

The unit under test was the following IP-Pro case:

UUT No.	Type	Item number
1	SCHROFF IP-Pro Case	26880-003

The UUT was mounted in a fixture supplied by the customer.
The dimensions of the UUT were 90mm height, 160mm width and 160mm depth.

2 Order

2.1 Date of order, client

Company nVent, Schroff GmbH orders from TÜV SÜD Product Service GmbH with order sheet dated 13.07.2020, order No. 4502410389 to test a.m. UUT.

2.2 Receipt of UUT

The sample was delivered by the client on 25.06.2020.

2.3 Location of Testing

The UUT was tested at laboratory in Mannheim.

2.4 Reconsignment of UUT

The sample was taken by the client on 07.07.2020.

3 Test specification

The UUT was in operation during test. Test specification according to DIN EN 61373: 2011 - Category 2, AREMA Class I.

3.1 Vibration test, random (DIN EN 61373: 2011 – Category 2)

3.1.1 Vibration test, random, longitudinal direction – (Functional Test)

Frequenzbereich:	5 Hz - 250 Hz		
Spektrale			
Beschleunigungsdichte:	5 Hz - 10 Hz	9 dB	
	10 Hz - 100 Hz	0,0414 (m/s ²) ² /Hz	
	100 Hz - 250 Hz	-6 dB	
Beschleunigung:	2,5 m/s ² _{eff.}		
Prüfdauer:	10 min		

3.1.2 Vibration test, random, longitudinal direction – (Measurements+ Lifetime test)

Frequenzbereich:	5 Hz - 250 Hz		
Spektrale			
Beschleunigungsdichte:	5 Hz - 10 Hz	9 dB	
	10 Hz - 100 Hz	1,32 (m/s ²) ² /Hz	
	100 Hz - 250 Hz	-6 dB	
Beschleunigung:	14,2 m/s ² _{eff.}		
Prüfdauer:	5 h		

3.1.3 Vibration test, random, transversal direction – (Functional Test)

Frequenzbereich:	5 Hz - 250 Hz	
Spektrale		
Beschleunigungsdichte:	5 Hz - 10 Hz	9 dB
	10 Hz - 100 Hz	0,144 (m/s ²) ² /Hz
	100 Hz - 250 Hz	-6 dB
Beschleunigung:	4,7 m/s ² _{eff.}	
Prüfdauer:	10 min	

3.1.4 Vibration test, random, transversal direction – (Measurements+ Lifetime test)

Frequenzbereich:	5 Hz - 250 Hz	
Spektrale		
Beschleunigungsdichte:	5 Hz - 10 Hz	9 dB
	10 Hz - 100 Hz	4,62 (m/s ²) ² /Hz
	100 Hz - 250 Hz	-6 dB
Beschleunigung:	26,6 m/s ² _{eff.}	
Prüfdauer:	5 h	

3.1.5 Vibration test, random, vertical direction – (Functional Test)

Frequenzbereich:	5 Hz - 250 Hz	
Spektrale		
Beschleunigungsdichte:	5 Hz - 10 Hz	9 dB
	10 Hz - 100 Hz	0,19 (m/s ²) ² /Hz
	100 Hz - 250 Hz	-6 dB
Beschleunigung:	5,4 m/s ² _{eff.}	
Prüfdauer:	10 min	

3.1.6 Vibration test, random, vertical direction – (Measurements+ Lifetime test)

Frequenzbereich:	5 Hz - 250 Hz	
Spektrale		
Beschleunigungsdichte:	5 Hz - 10 Hz	9 dB
	10 Hz - 100 Hz	6,12 (m/s ²) ² /Hz
	100 Hz - 250 Hz	-6 dB
Beschleunigung:	30,6 m/s ² _{eff.}	
Prüfdauer:	5 h	



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3.2 Vibration test, sine (AREMA Class I).

3.2.1 Vibration test, endurance

Frequency range:	5 Hz to 200 Hz	
Amplitude:	5 Hz to 10 Hz	7,62 mm
Acceleration:	10 Hz to 200 Hz	1,5 g

Sweep rate: 0,9 Oct./min
Test duration: 4 h / axis, in 3 axes

3.3 Shock test

3.3.1 Shock test, DIN EN 61373: 2011 – Category 2

Type of shock: halfsine
Acceleration: 30 g
Shock duration: 18 ms
Number of shocks: 3 shocks each in both directions on three mutually perpendicular axes of the UUT.

3.3.2 Shock test, AREMA Class I (Shipping & Operating)

Type of shock: Terminal peak sawtooth
Acceleration: 10 g
Shock duration: 11 ms
Number of shocks: 6 shocks each in both directions on three mutually perpendicular axes of the UUT.

4 Test equipment

Equipment	Type	Ser. No.	Manufacturer	Calibrated until
Shaker S3	V875-440	S 5003-001/1 and S 5003-006/1	Ling Dynamic Systems	—
Vibration control system 1	V Win II	10012925.	Unholtz-Dickie	12/2020
Signal conditioner 2	CVA-8	2319	Unholtz-Dickie	05/2021
Accelerometer	4500A	30285; 07-10/10-10-011	Brüel & Kjaer	05/2021
Accelerometer	4500A	30286; 07-10/10-10-012	Brüel & Kjaer	12/2020
Accelerometer	T10B10	2624; 07-10/10-00-001	Unholtz-Dickie	05/2021
Accelerometer	T10B10T	8562; 07-10/10-10-018	Unholtz-Dickie	12/2020

All measuring equipment is calibrated regularly according the calibration instructions of TÜV SÜD PRODUCT SERVICE GmbH. All calibrations are traced back to national standards.

5 Test sequence

Test date: from 25.06.2020 to 29.06.2020

According to DIN EN 61373

No.	Test specification	Run	Axis	Notes
1	Vibration, random	2026 -1	L	Initial measurement – Function okay
2		2026 -2		Functional test – Function okay
3		2026 -3		Lifetime test – Function okay
4	Shocks	2026 -4		Shocks ± 3 – Function okay
5	Vibration, random	2026 -5		Final measurement – Function okay
6	Vibration, random	2026 -6	T	Initial measurement – Function okay
7		2026 -7		Functional test – Function okay
8		2026 -8		Lifetime test – Function okay
9	Shocks	2026 -9		Shocks ± 3 – Function okay
10	Vibration, random	2026 -10		Final measurement – Function okay
11	Vibration, random	2026 -11	V	Initial measurement – Function okay
12		2026 -12		Functional test – Function okay
13		2026 -13		Lifetime test – Function okay
14	Shocks	2026 -14		Shocks ± 3 – Function okay
15	Vibration, random	2026 -15		Final measurement – Function okay

L: Longitudinal direction

T: Transversal direction

V: Vertical direction

Test date: from 29.06.2020 to 01.07.2020

According to AREMA class I

No.	Test specification	Run	Axis	Notes
16	Vibration, sine	2027 -7	T	Function okay
17	Shocks, Shipping	2027 -8		Shocks ± 3 – Function okay
18	Shocks, Operating	2027 -9		Shocks ± 3 – Function okay
19	Vibration, sine	2027 -10	L	Function okay
20	Shocks, Shipping	2027 -11		Shocks ± 3 – Function okay
21	Shocks, Operating	2027 -12		Shocks ± 3 – Function okay
22	Vibration, sine	2027 -13	V	Function okay
23	Shocks, Shipping	2027 -14		Shocks ± 3 – Function okay
24	Shocks, Operating	2027 -15		Shocks ± 3 – Function okay

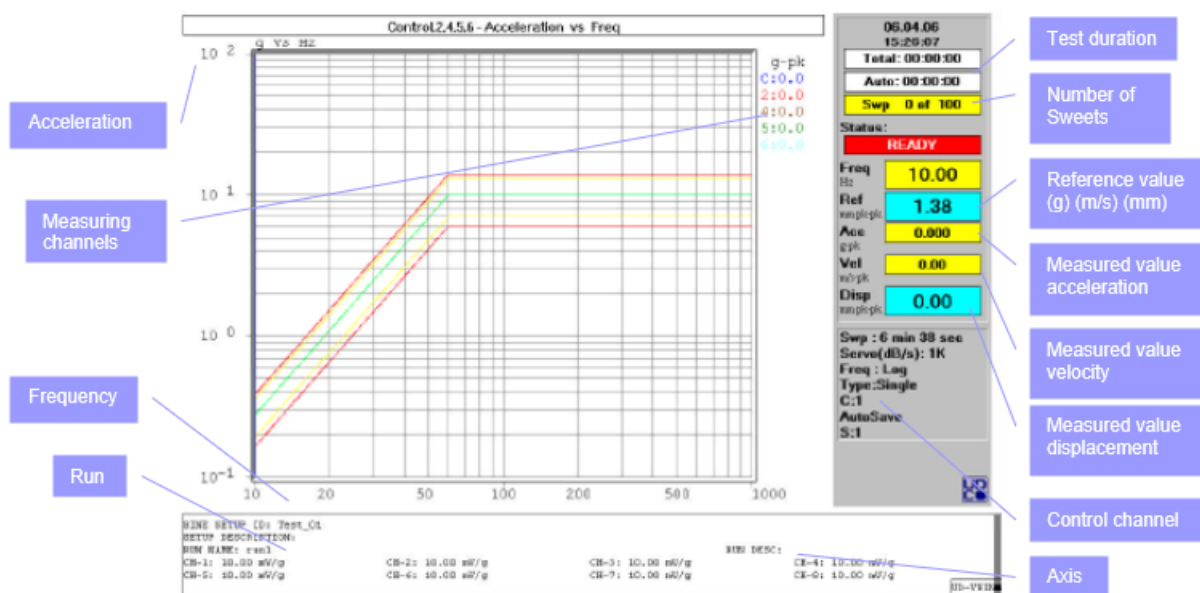
L: Longitudinal direction

T: Transversal direction

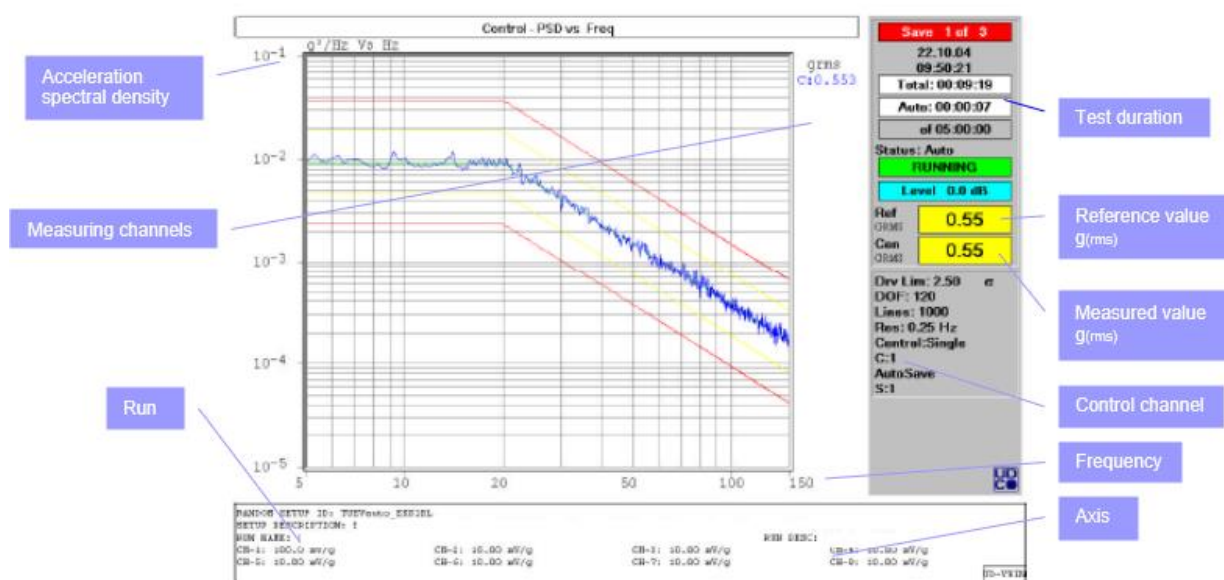
V: Vertical direction

6 Legend of measuring diagrams

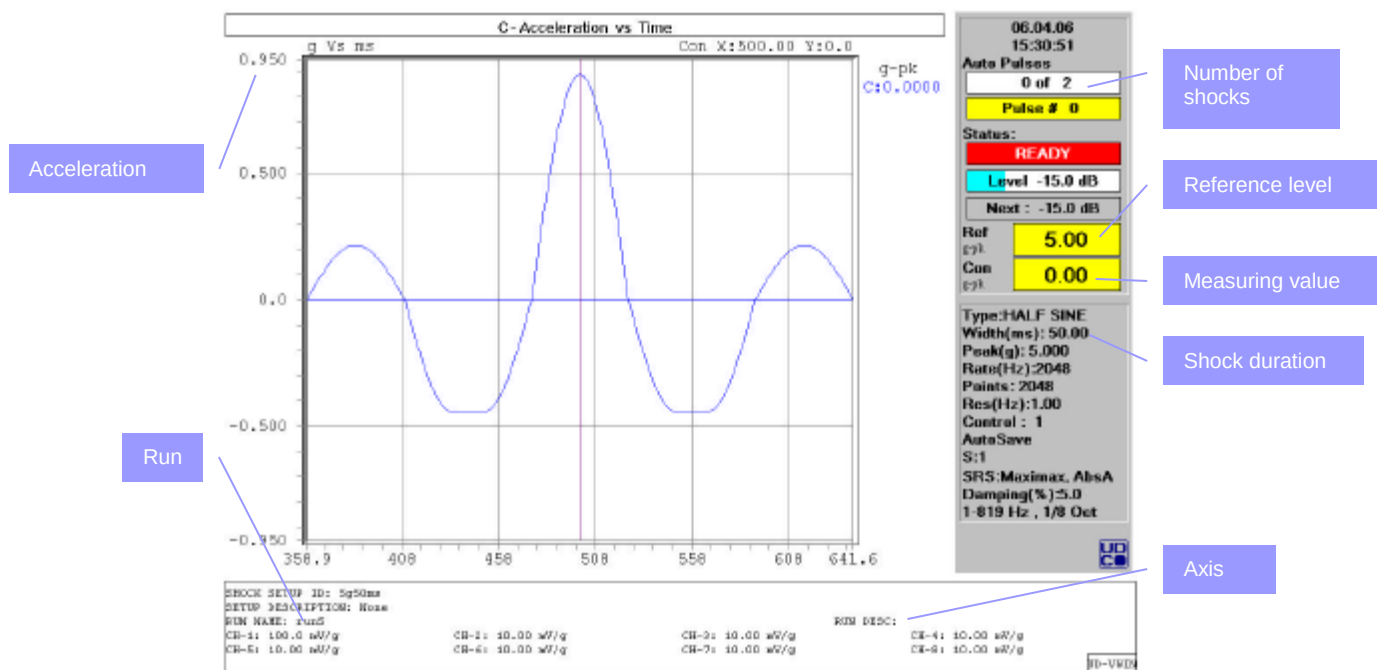
6.1 Vibration test, sine



6.2 Vibration test, random



6.3 Shock test

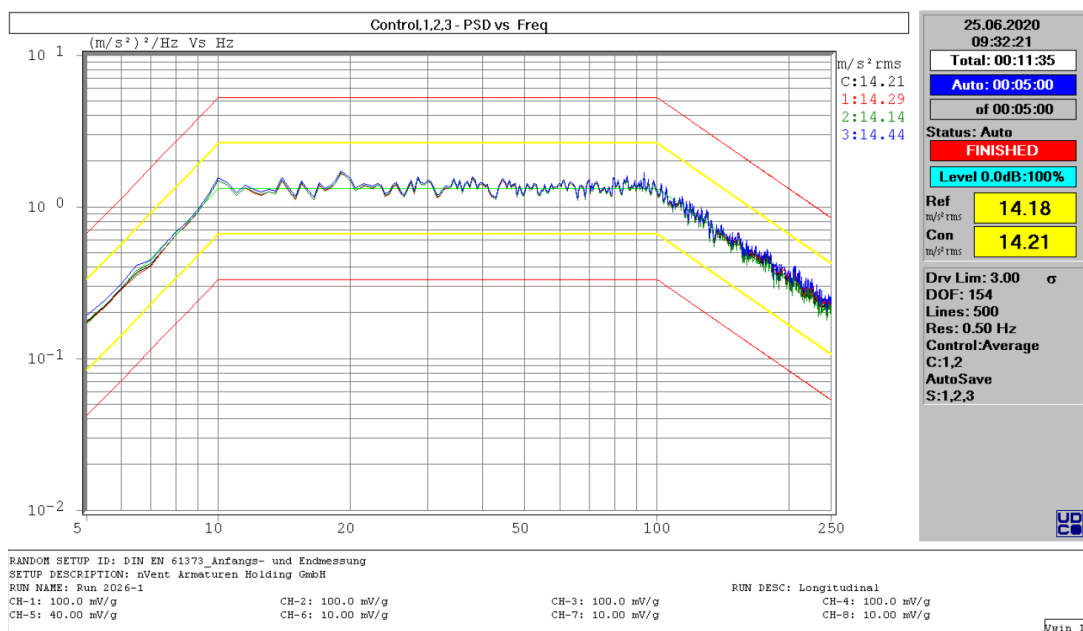


Note: Before applying the test shocks several reference shocks of a lower level (-9 dB) were applied as equipment test. This explains the different number of shocks in the measuring diagrams.

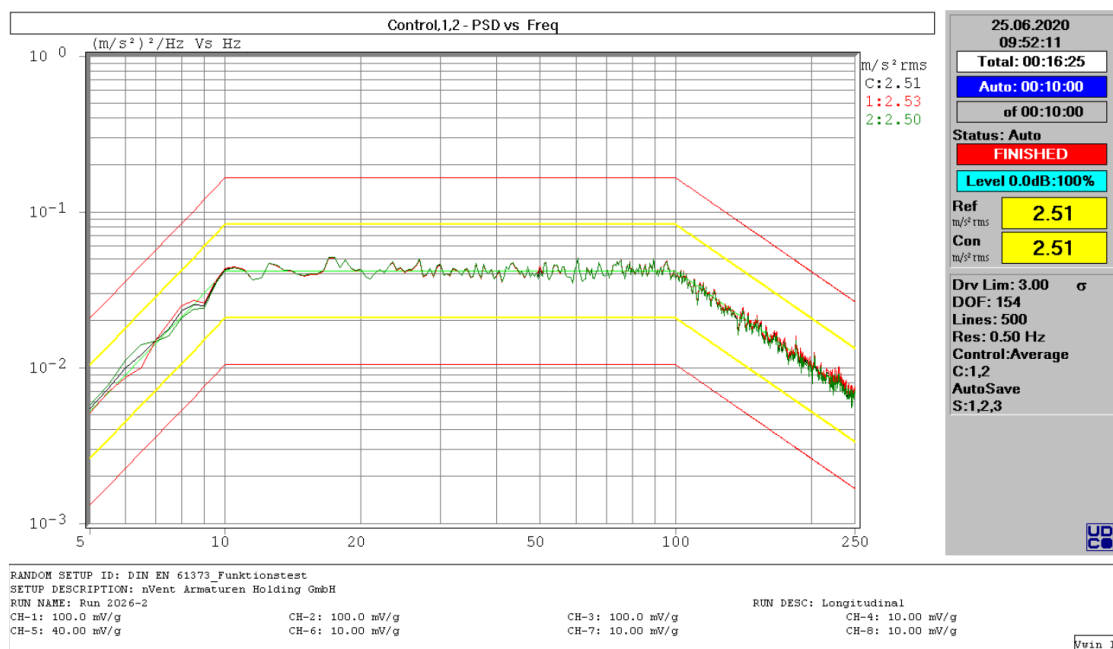
7 Test documentation

7.1 Measuring diagrams of the vibration tests, random

Run 2026-1, longitudinal



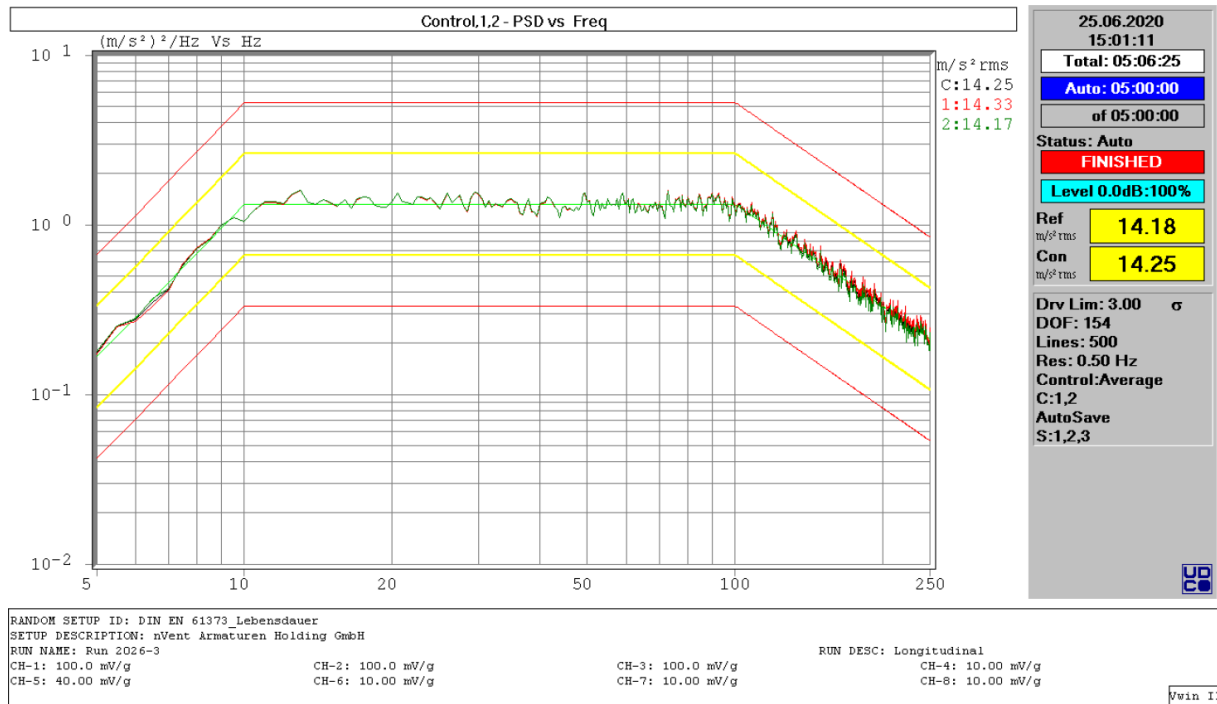
Run 2026-2, longitudinal



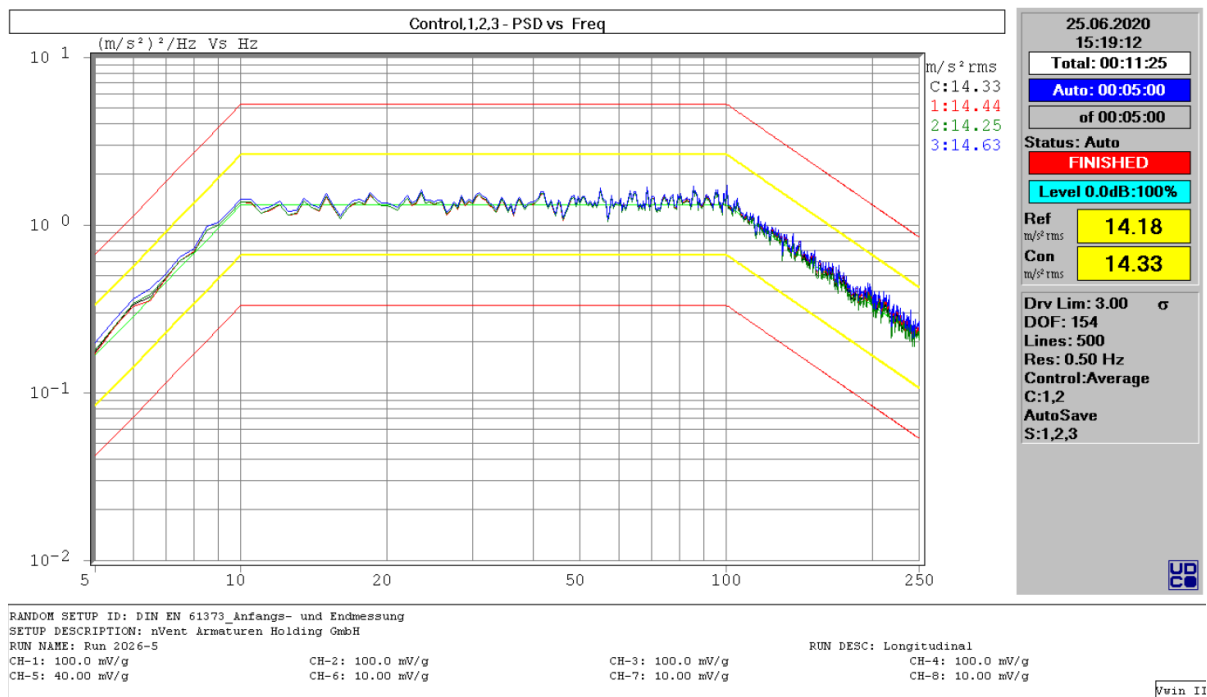
Run 2026-3, longitudinal



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Run 2026-5, longitudinal



Run 2026-6, transversal

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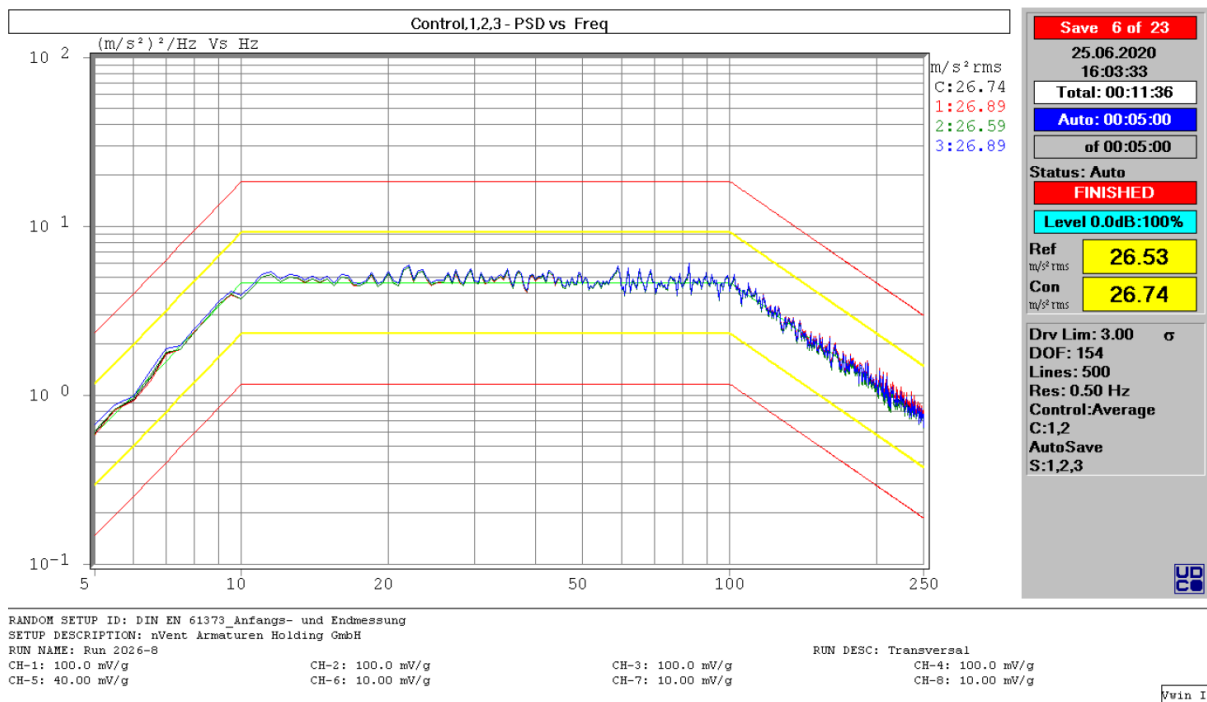
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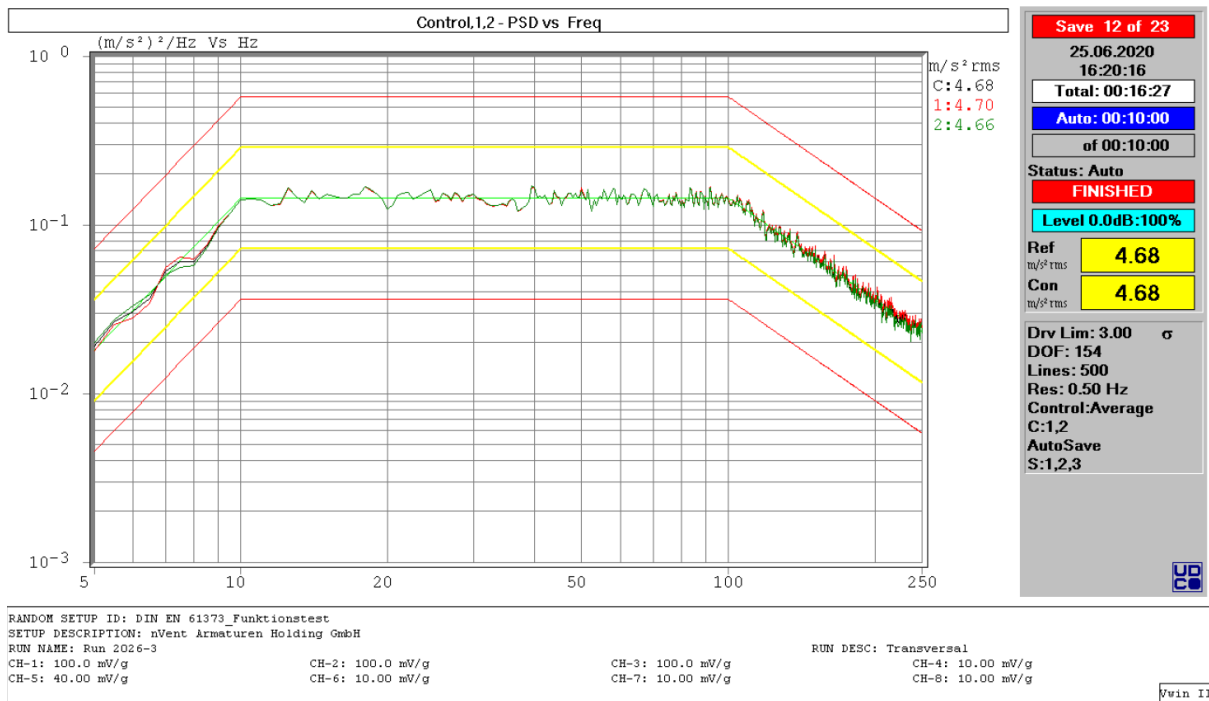
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Run 2026-7, transversal



Run 2026-8, transversal

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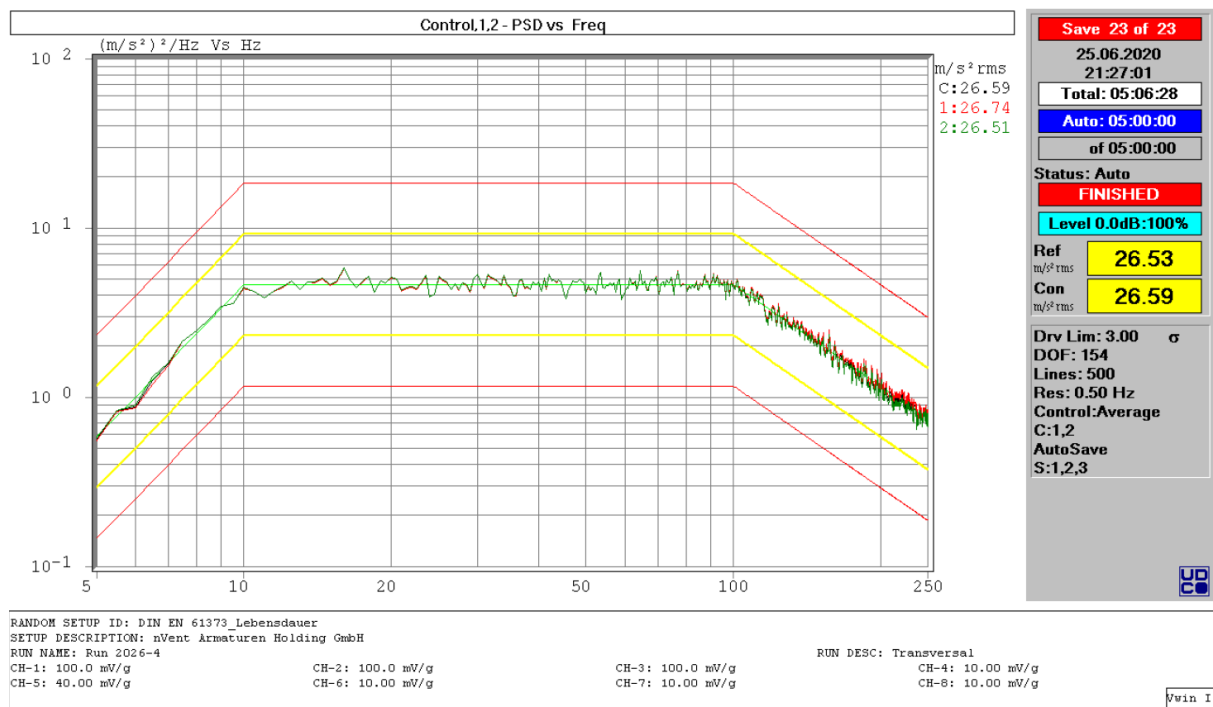
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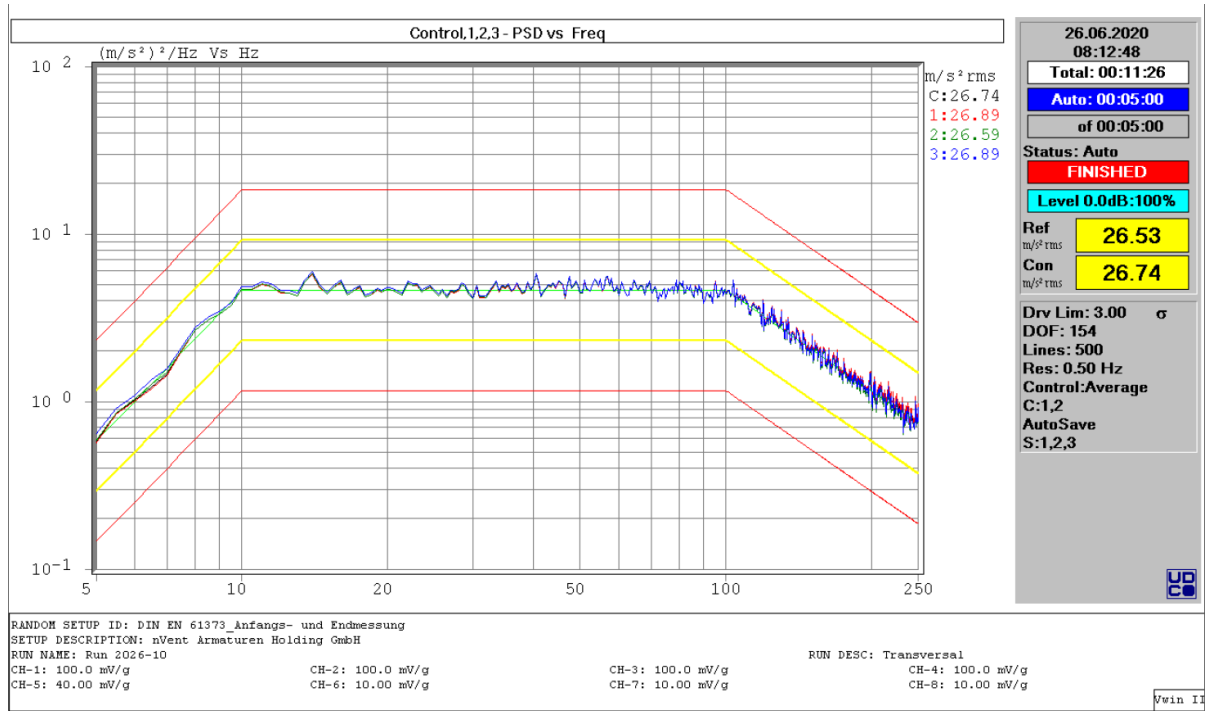
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Run 2026-10, transversal



Run 2026-11, vertical

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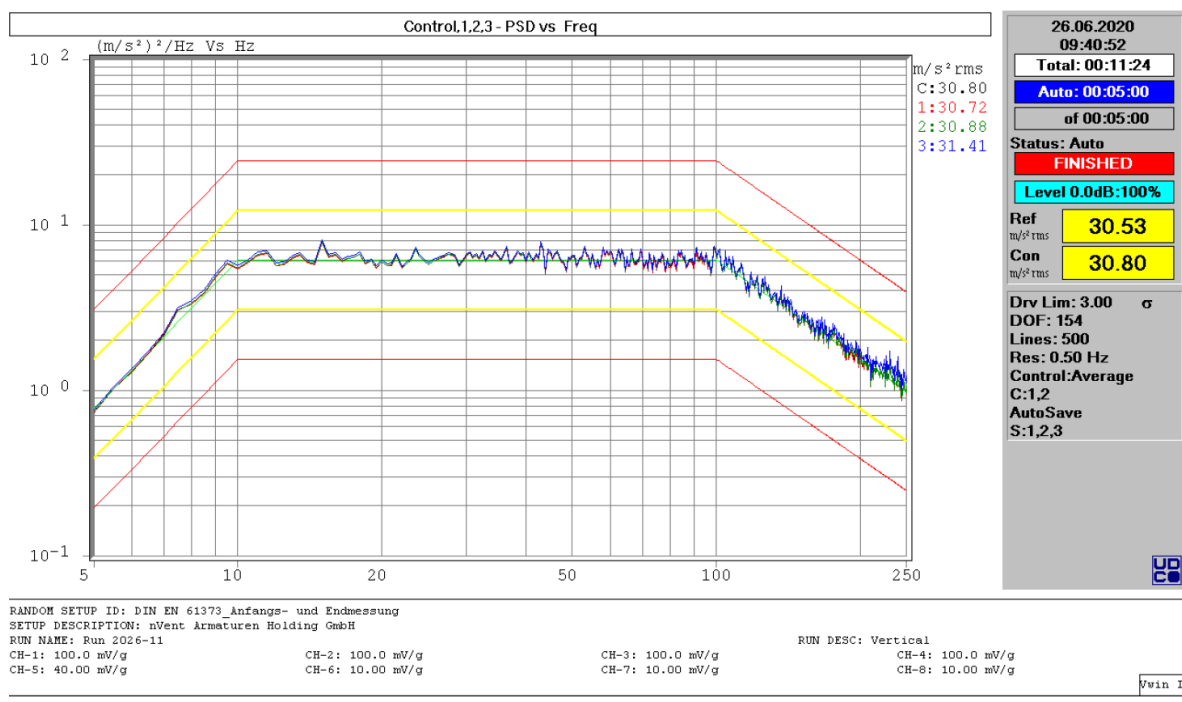
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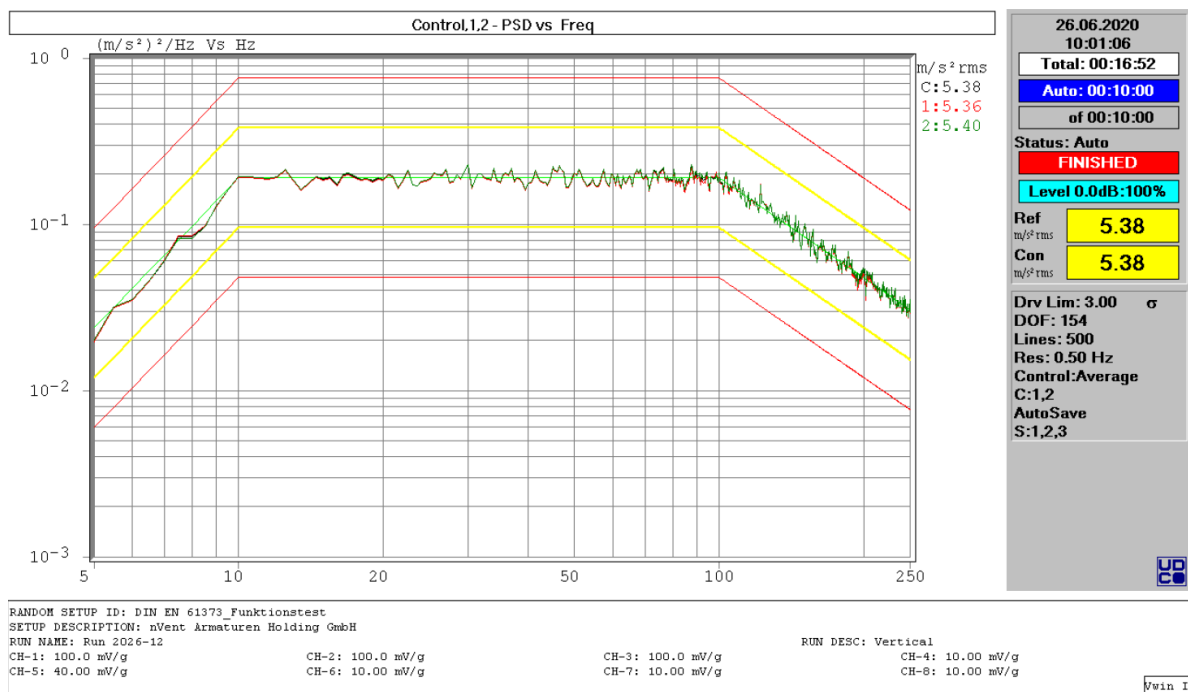
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Run 2026-12, vertical



Run 2026-13, vertical

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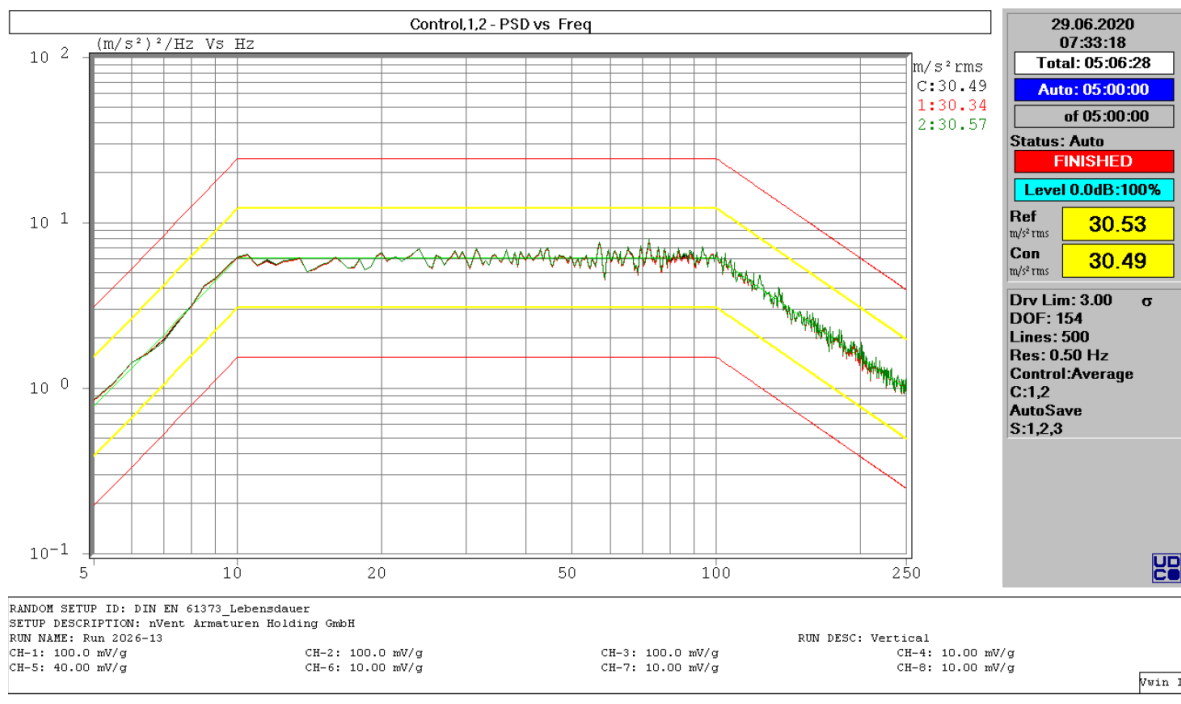
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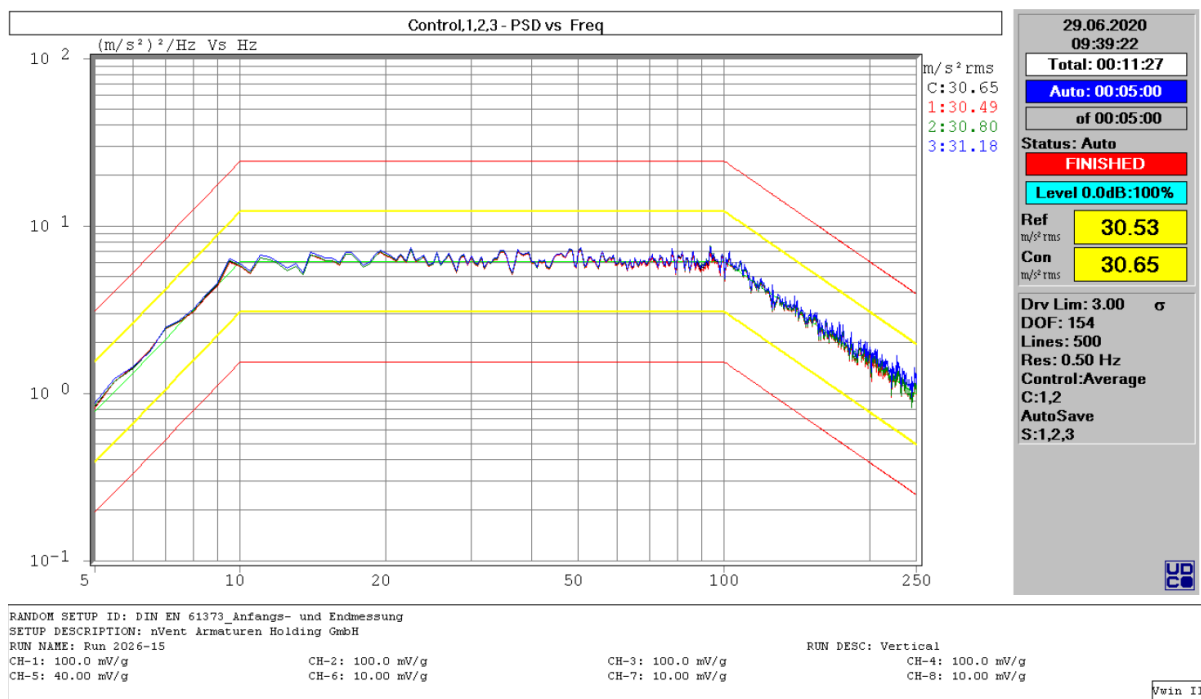
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Run 2026-15, vertical



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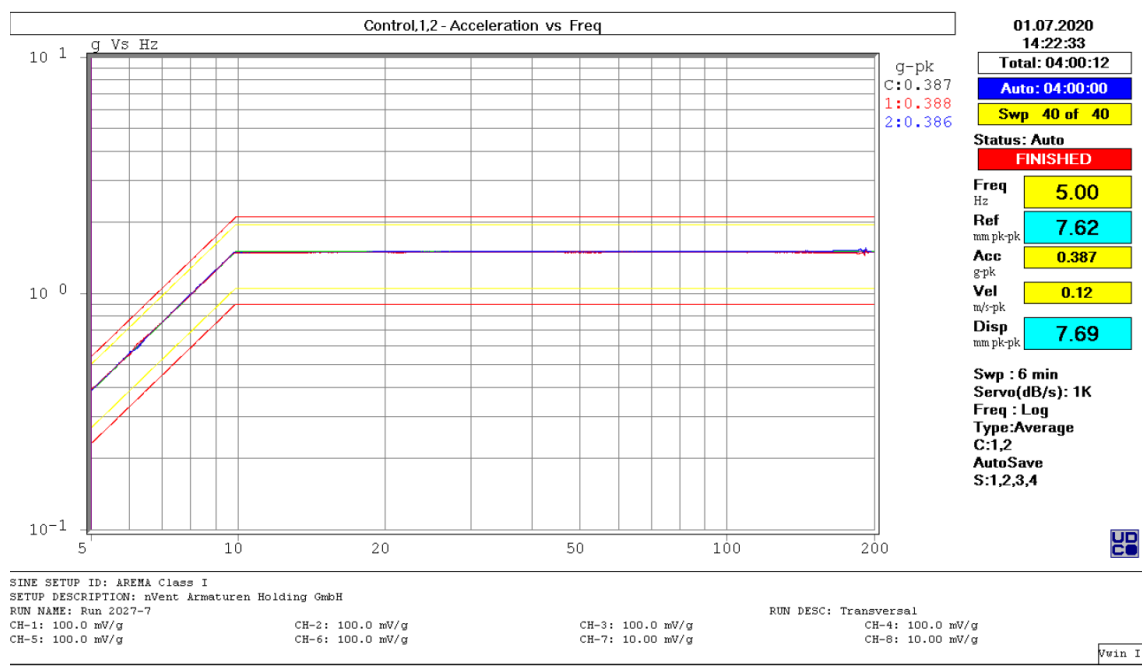
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7.2 Measuring diagrams of the vibration test, sine

Run 2027-7 + 10 + 14, transversal, longitudinal, vertical



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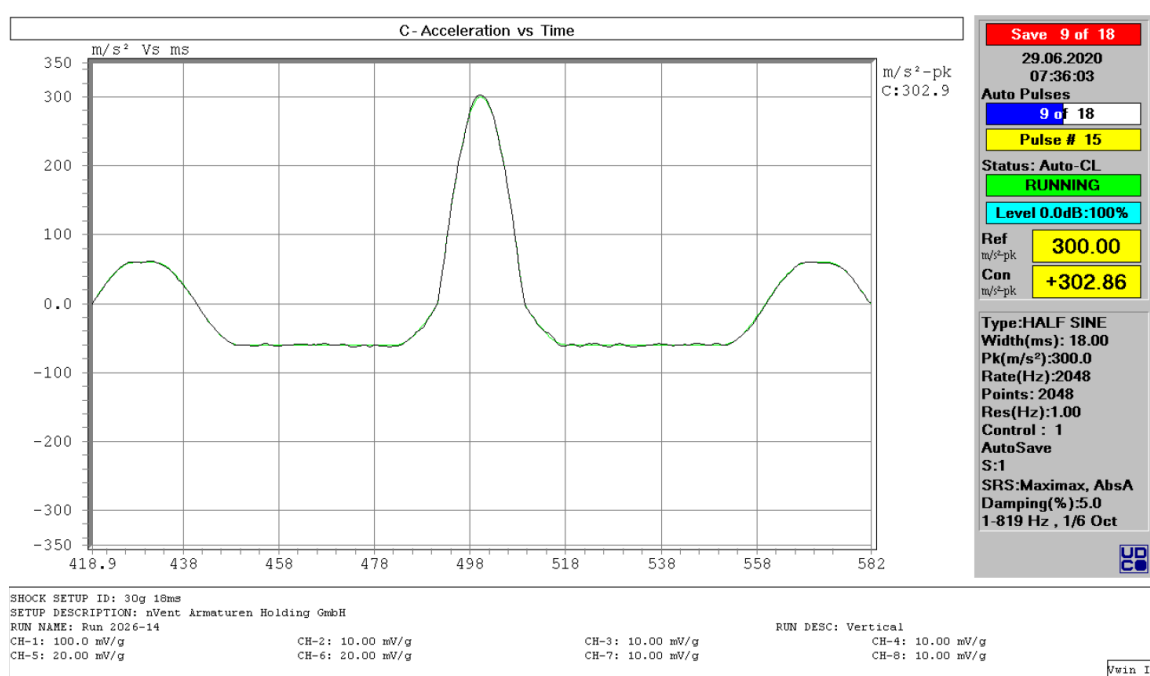
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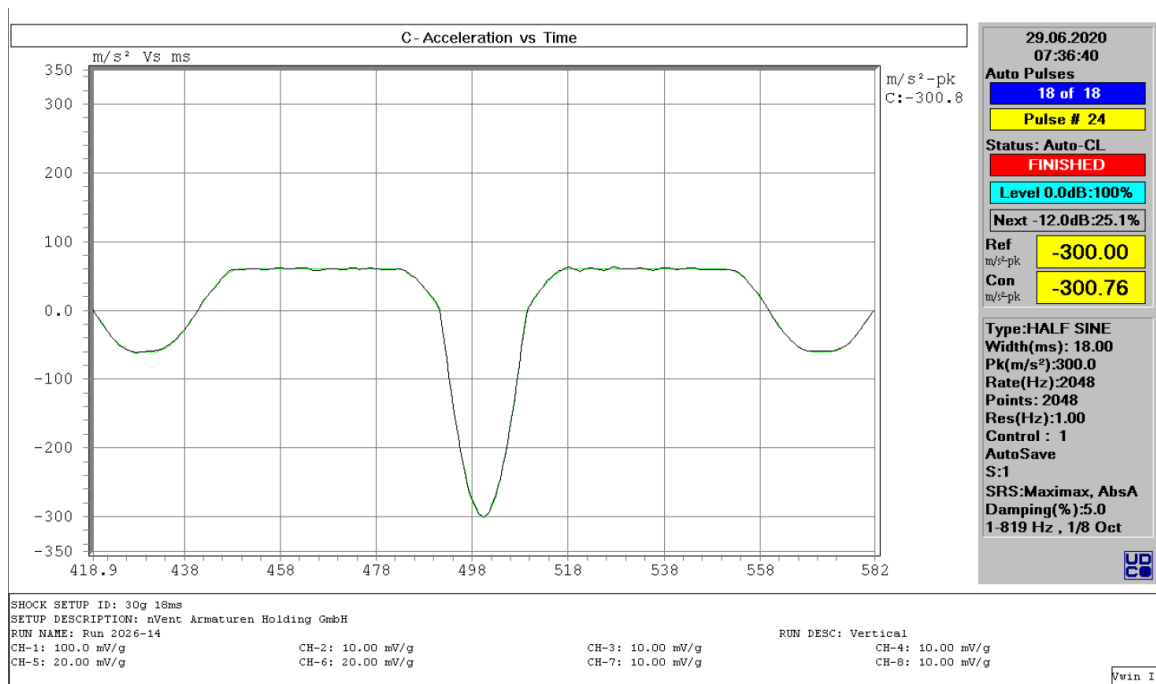
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7.3 Measuring diagrams of the shock tests

Run 2026- 9 + 14, Positive impulse



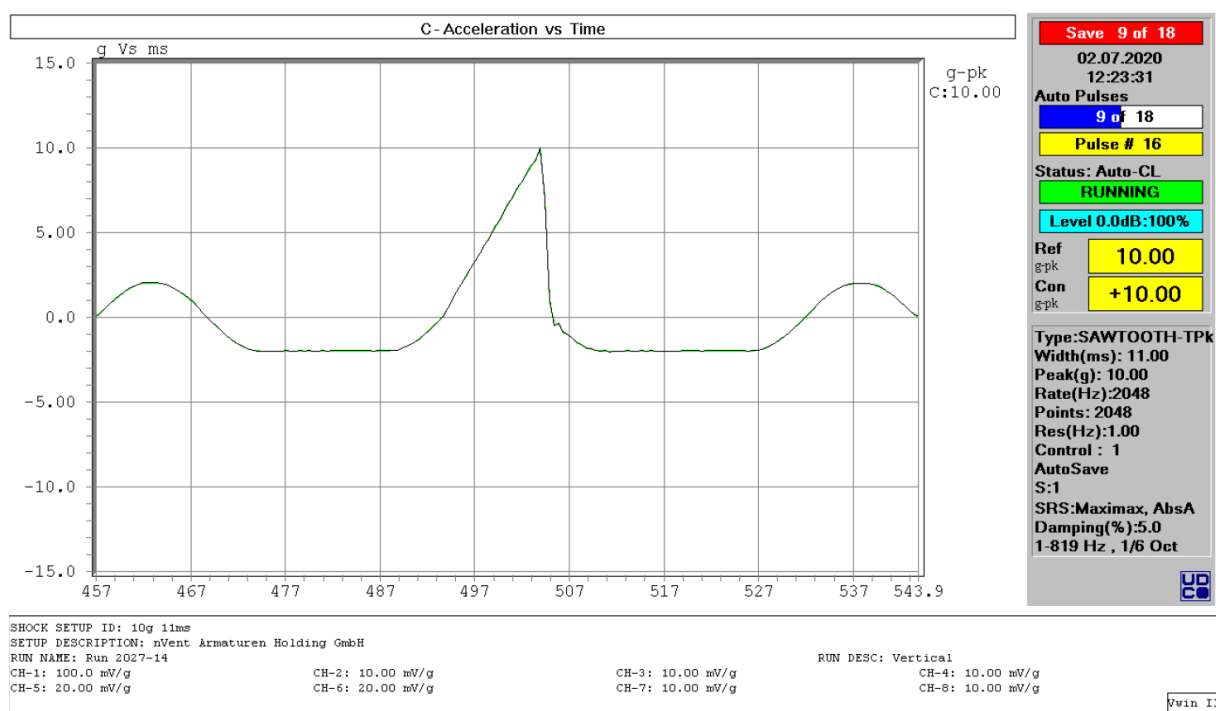
Run 2026-4 + 9 + 14, Negative impulse



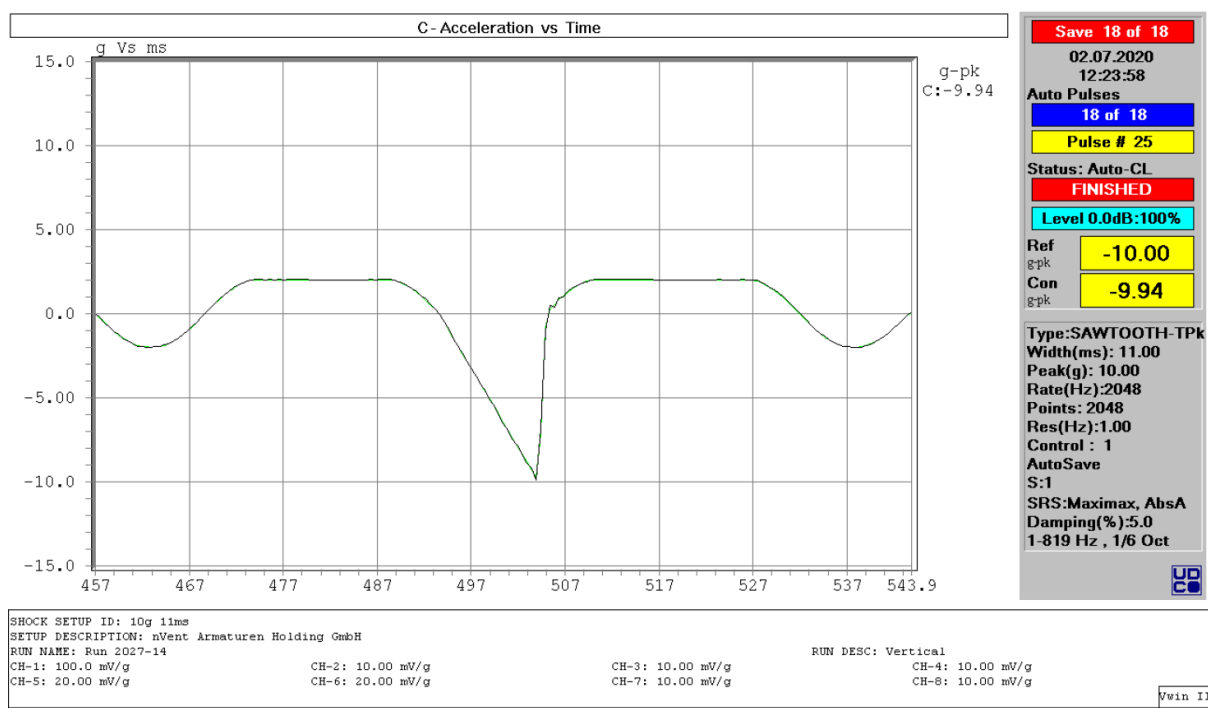


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Run 2027-8-9 + 11-12 + 14-15, Positive impulse



Run 2027-8-9 + 11-12 + 14-15, Negative impulse



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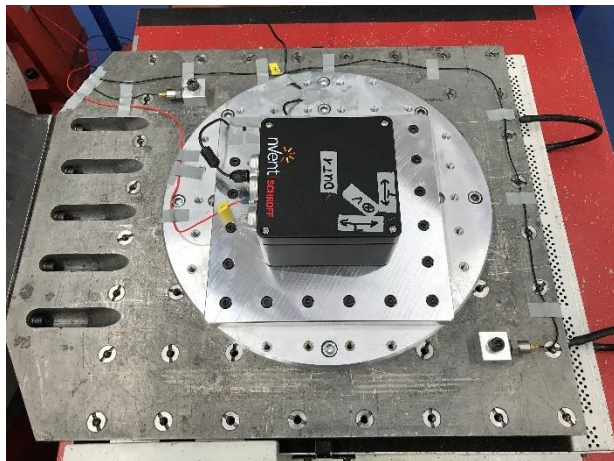
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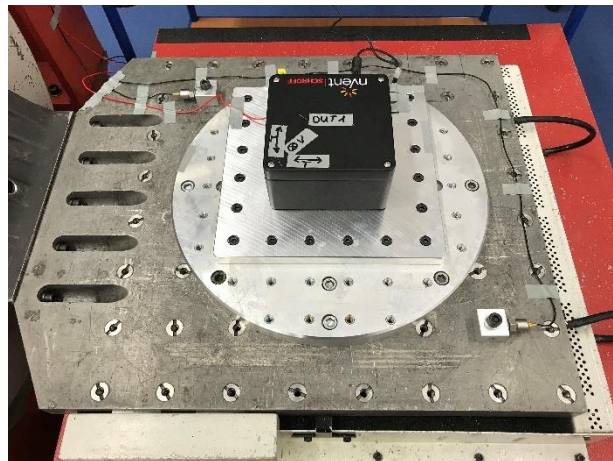
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8 Photo documentation



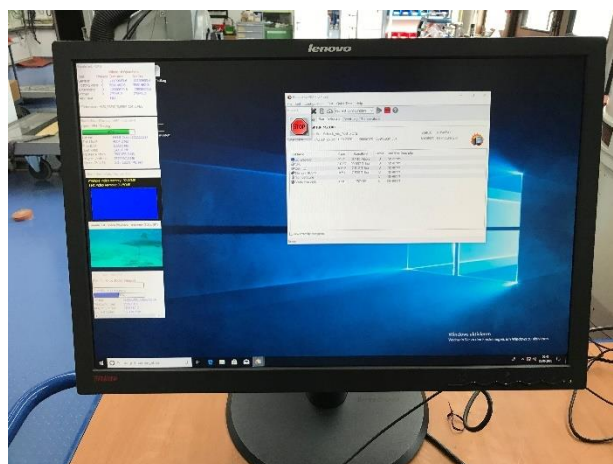
1: Test setup, longitudinal



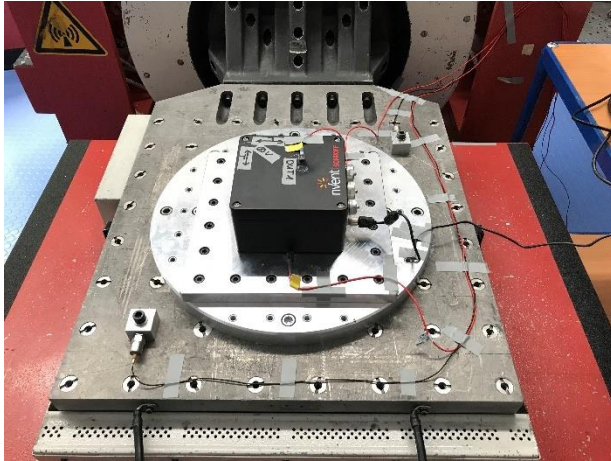
2: Test setup, transversal



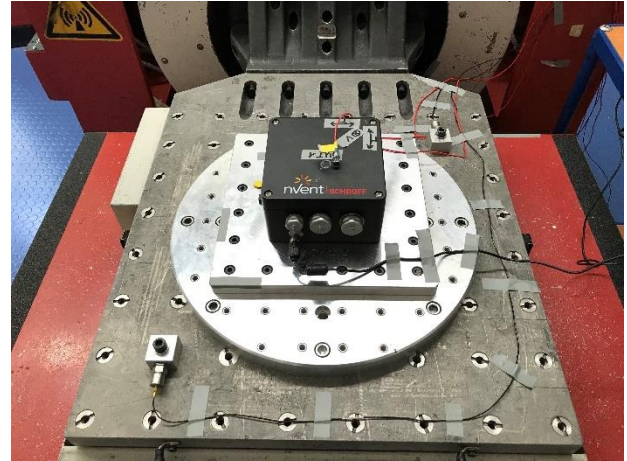
3: Test setup, vertical



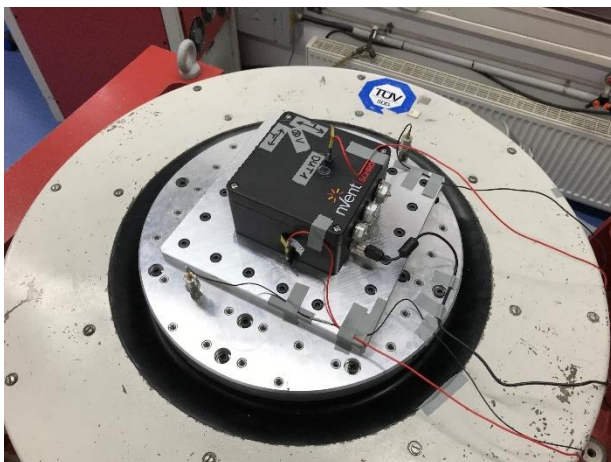
4: Monitoring software after DIN EN 61373 test



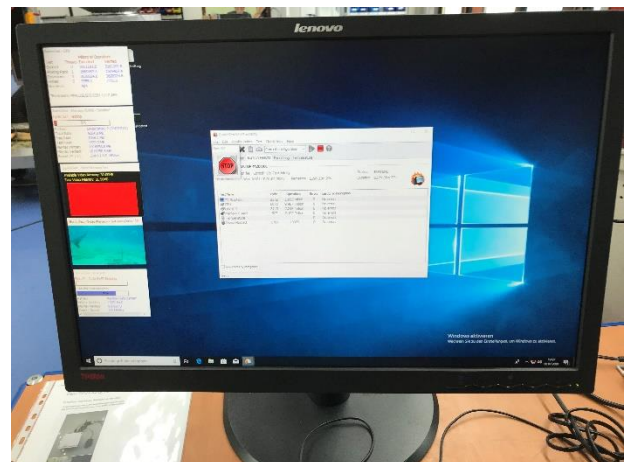
5: Test setup, transversal



6: Test setup, longitudinal



7: Test setup, longitudinal



8: Monitoring software after AREMA class I test

Verified
Signature



Uwe Marlok
Laboratory Manager

Edited
Signature



Waldemar Anschütz
Test Engineer