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Reliability Test Report for BFX-AT100

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Revision Change History

Revision	Description of Change	Date
1.0	Initial Release	02/15/2023
2.0	Additional test quantity for drop	03/09/2023

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Purpose:

1. Provide a formal functional demonstration of the product design reliability.
2. Identify any design discrepancies.
3. Reliability assurance of trial samples which are designed and fabricated in accordance with the customer's product specifications.
4. Conduct robustness testing on early production samples in accordance to customer's product environmental testing specification.

Scope:

This document describes the performance requirements, validation criteria, and the validation tests which focus on BFX-AT100 MP stage product.

The DUT H/W version is V125 and S/W revision is BFX_AT100-uesrdebug 9 PI 20200305 release-keys.

Second source:

New ABS housing (T3 sample) & rubber 2nd (FUFA).

The summary of test items:

NO.	Item	Test Condition	Q'ty	Period	Pass Criteria	Refer Standard	Test result
1	Temperature and humidity cycles test	Power off, storage in temperature and humidity environment at 70 / - 20°C (Dwell 12 hrs) and 90 %R.H. Total: 72 hrs	2 units	4 days	1. No functional failures both before and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	IEC 60068-2-30	PASS
2	High Temperature & Humidity Test (Op)	Power on, Operation, Ta = 50°C, Humi.= 90%R.H. for 72 hours	2 units	4 days	1. No functional failures both during and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	IEC 60068-2-78	PASS
3	Thermal Shock	Power off , non-OP, Ta= - 20C (30min) ~ 70C (30min) 15 cycles, Transfer time : 5 min	2 units	3 days	1. No functional failures both before and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	MIL-STD-810F	PASS
4	Vibration Test Random (Op)	1. 0.002G ² /Hz 2. 5 to 500HZ 3. Direction: 3 mutually Perpendicular axis 4. Duration:30 min/ axis	2 units	2 days	1. No functional failures both during and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	IEC 60068-2-64	PASS
5	Shock test (Op)	1. Shock spectrum: Half sine, Duration: 11 ms, 2. Acceleration: 30 m/s ² , Direction of shocks: 6 3. Test duration: 6 faces x 3 shocks	2 units	2 days	1. No functional failures both during and after the test 2. No performance degradation during the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	IEC 60068-2-27	PASS
6	Drop test	1. Height for fall test: 750 mm 2. Steel floor 3. Drop 6 faces	2 units	1 day	1. No functional failures both before and after the test 2. No performance degradation before the functional test 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	IEC-60950-01	PASS

Panel Drawing:

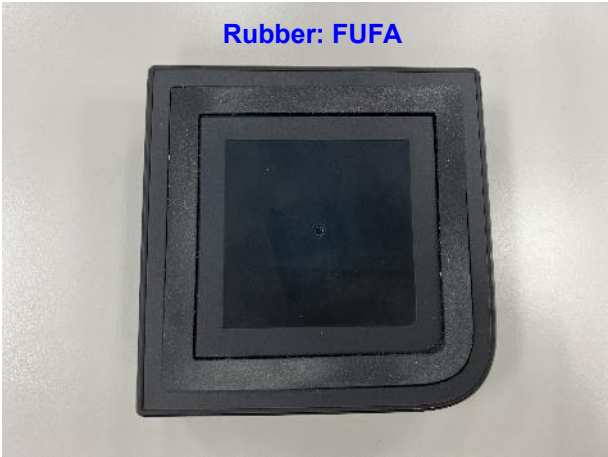
Front



Rear



Bottom



I/O Port



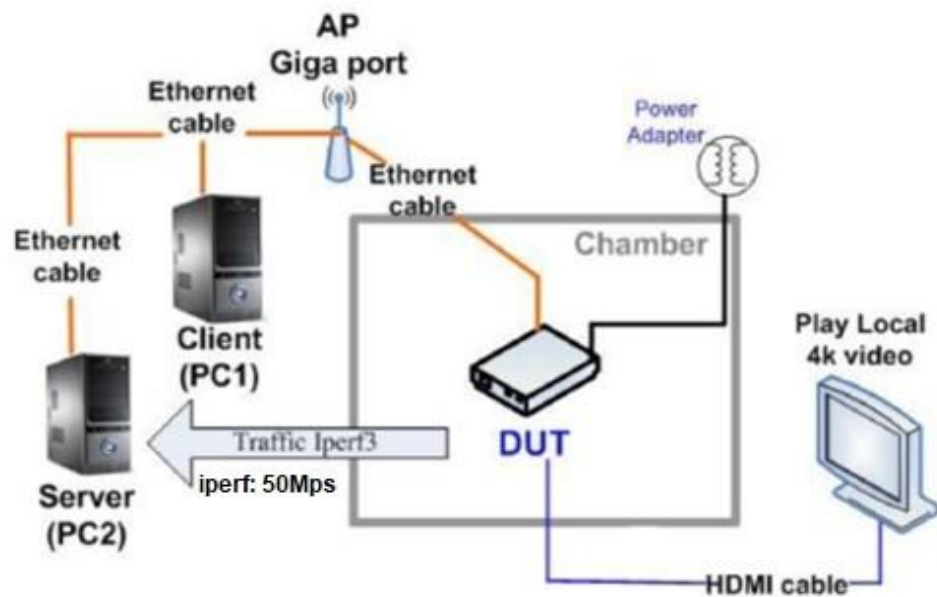
Adapter



RCU



Test setup and function test:



Connection:

Interface	Connection	Operation
AC power	The AC adapter is connected to the AC source	Powered on
DUT	DUT HDMI connected to Monitor	Play the local video
LAN	DUT, LAN connect to AP run iperf packet between PC	Continue to run iperf packet between PC, throughput 50 Mbps

1. High/Low Temperature & Humidity Cycle Test

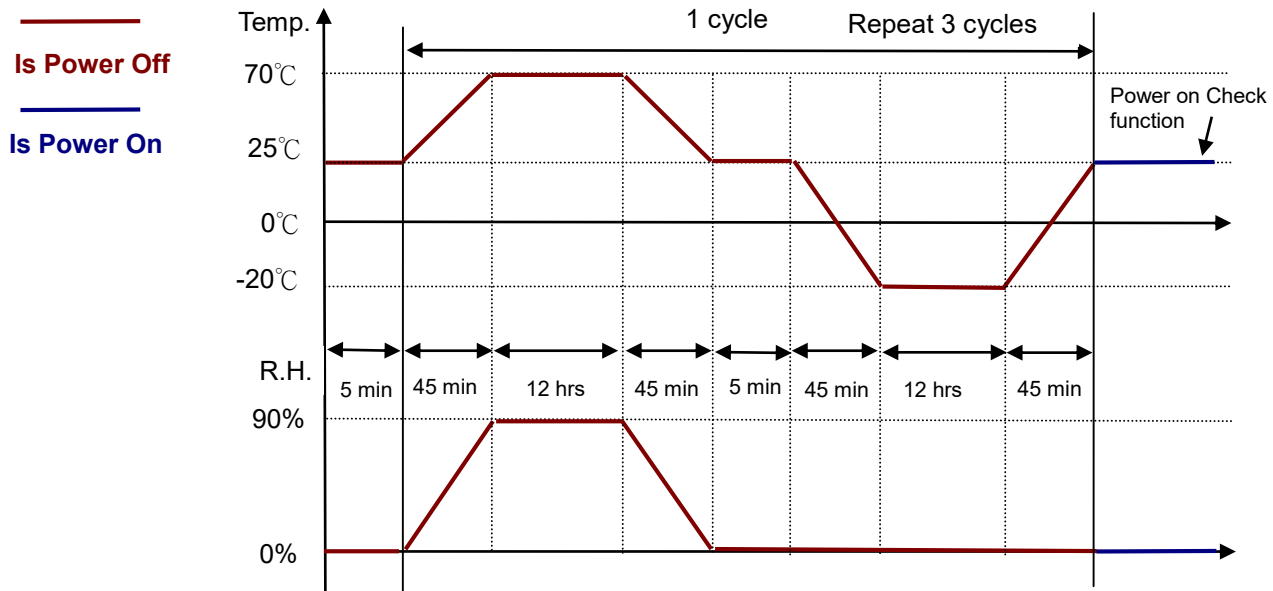
Purpose:

To demonstrate that products can storage in the high/low temperature and high humidity environment.

Quantity: 2 units (S/N: 2149688001202199000125, 2149688001202199000127)

Test Objective: Operating in high/low Temperature and high Humidity.

Test Profile:



Test Procedure:

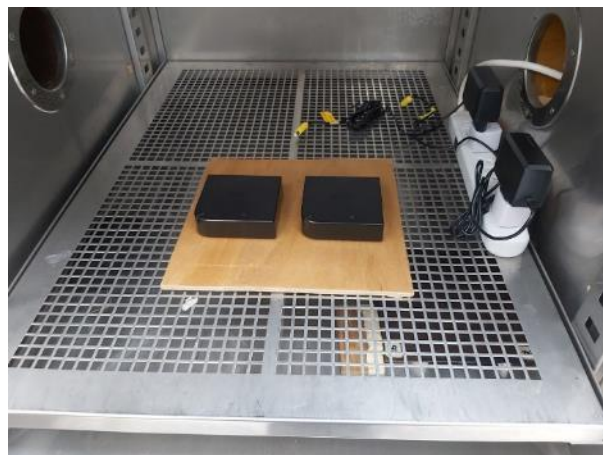
1. Power off.
2. Start test at 25°C for 5min.
3. Ramp up the temperature to 70°C & R.H. 90% for 12 hours.
4. Ramp down the temperature to - 20°C for 12 hours.
5. Repeat item 3~4 for 3 cycles.
6. Power on, check function.

Pass Criteria:

1. No functional failures both during and after the test.
2. No performance degradation during the functional test.
3. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Basis for Profile: IEC 60068-2-30

Test Result: **PASS**



2. High Temperature and Humidity Test

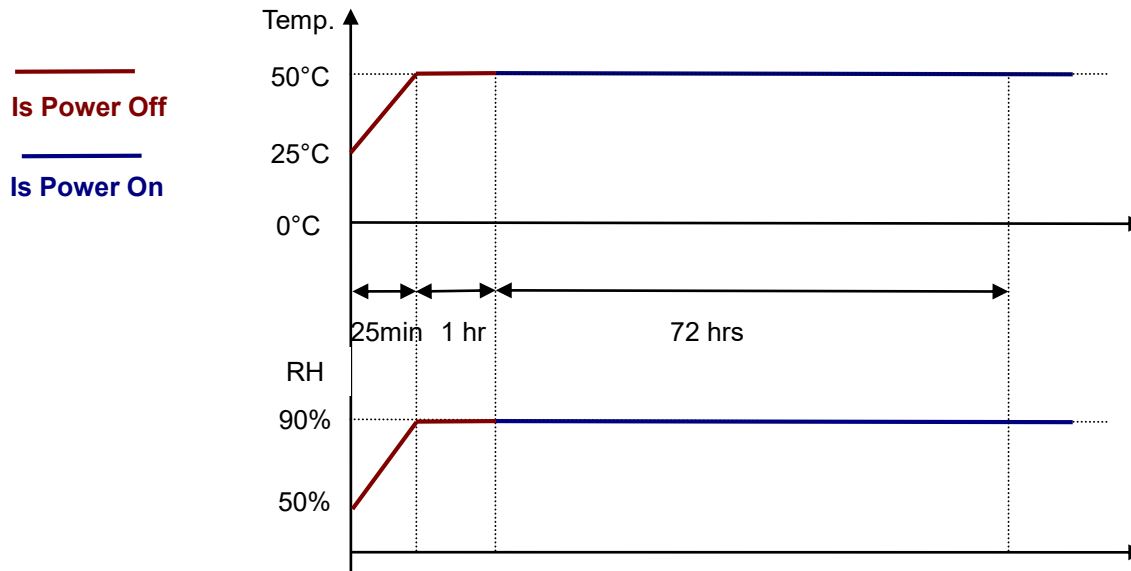
Purpose:

To demonstrate that products can withstand the high limit temperature and the high limit humidity of an operating environment.

Quantity: 2 units (S/N: 2149688001202199000125, 2149688001202199000127)

Test Objective: Operating Temperature and Humidity: Temp. 50°C and RH 90%, Duration: 72 hours.

Test Profile:



Test Procedure:

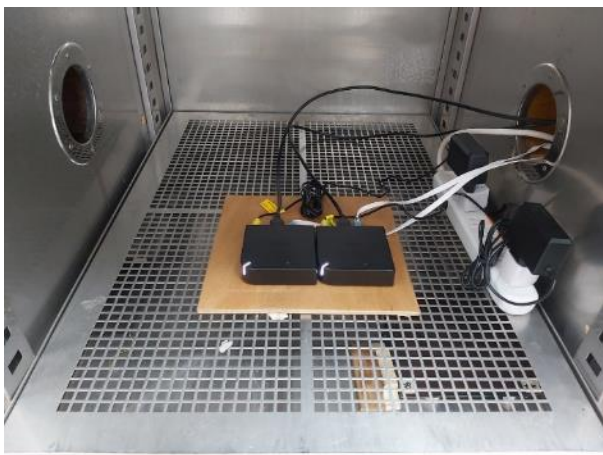
1. Power off.
2. Start test at 25°C and RH 50%.
3. Ramp the temperature to 50°C and RH 90% in 25 minutes, then hold for 1 hour.
4. Power on the test units.
5. Hold 50°C, RH 90% for 72 hours.

Pass Criteria:

1. No functional failures both during and after the test
2. No performance degradation during the functional test
3. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Basis for Profile: IEC 60068-2-78

Test Result: **PASS**



C:\Windows\System32\cmd.exe - iperf3 -s										C:\Windows\System32\cmd.exe - adb shell									
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3. Thermal Shock Test

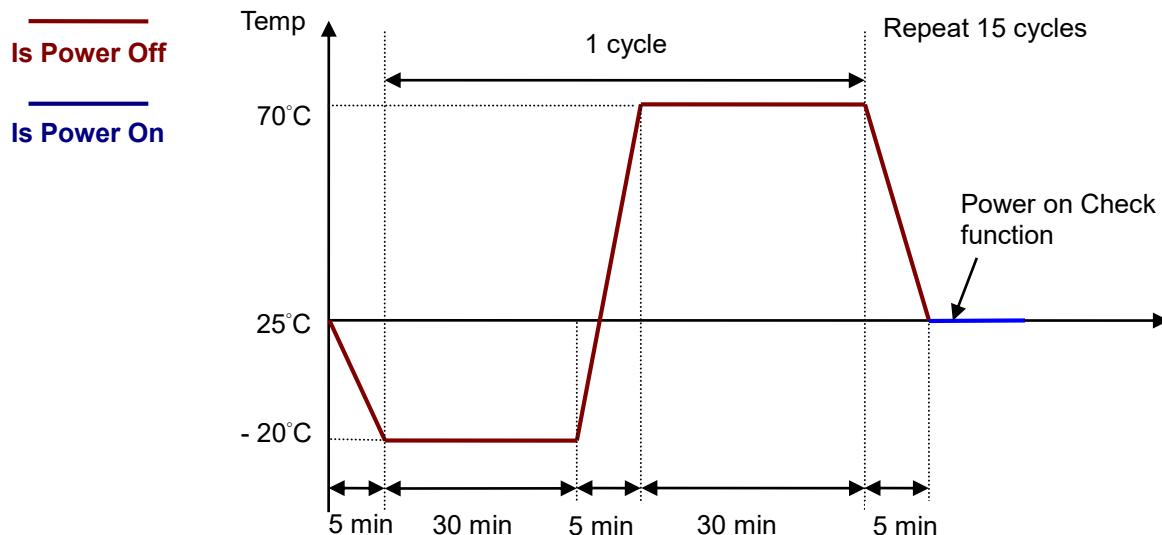
Purpose:

To demonstrate that the product can be operated after high & low temperature shock environment.

Quantity: 2 units (S/N: 2149688001202199000129, 2149688001202199000110)

Test Objective: $T_a = -20^{\circ}\text{C}$ (30minutes) $\sim 70^{\circ}\text{C}$ (30minutes), Cycle: 15 cycles,
Transfer time: 5 minutes.

Test Profile:



Test Procedure:

1. Power off.
2. Start test at 25°C.
3. Ramp the temperature to -20°C and hold for 30 minutes.
4. Ramp the temperature to 70°C and hold for 30 minutes.
5. Transfer time: 5 minutes.
6. After repeat 15 cycles. Power on, then activated in full function and operation.

Pass Criteria:

1. No functional failures both before and after the test.
2. No performance degradation after the functional test.
3. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Basis for Profile: MIL –STD-810F Method 503.4 Procedure I

Test Result: **PASS**



4. Vibration Test Random (Operation)

Purpose:

To reveal the accumulated effects of stress induced by the random vibration and the resulting mechanical weakness and degradation in specified performance and to use this information, in conjunction with the relevant specification to assess the acceptability of specimens.

To demonstrate the mechanical robustness of specimens.

Quantity: 2 units (S/N: 2149688001202199000129, 2149688001202199000110)

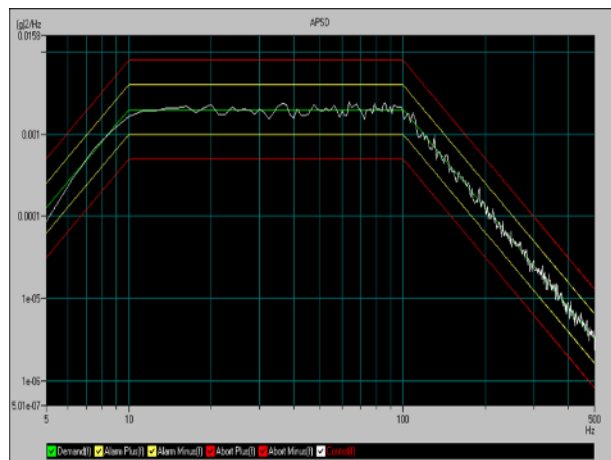
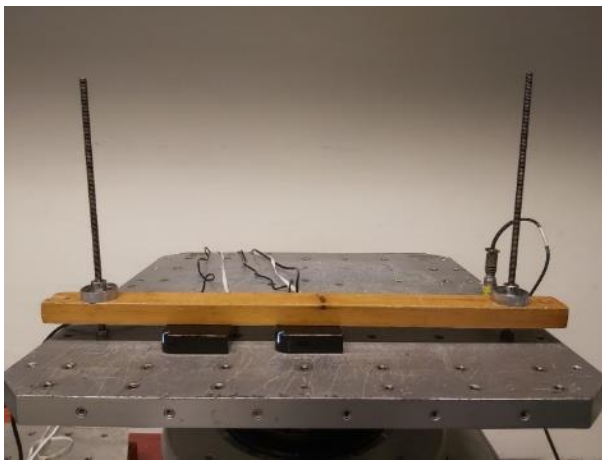
Test Objective: 1. $0.002G^2/Hz$

2. 5 to 500HZ

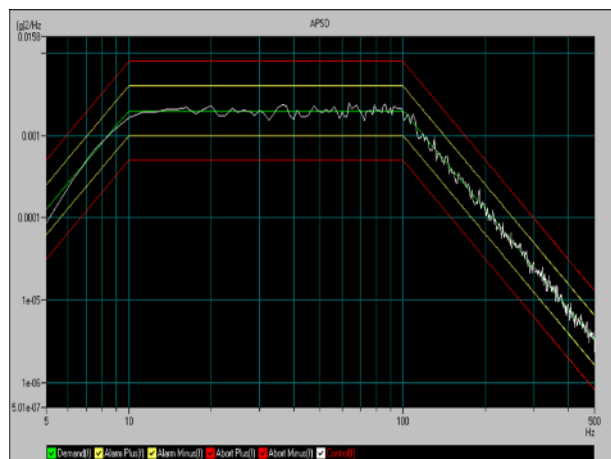
3. Direction: 3 mutually perpendicular axis

4. Duration: 30 min/ axis

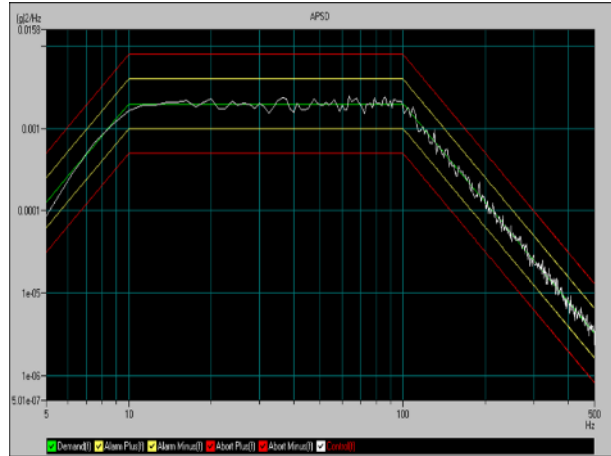
Test Profile:



X axis



Y axis



Z axis

Test Procedure:

Set the product fully function operating.

1. Fix the product on vibration mechanism.
2. Set the test program as above condition:
 - a. $0.002G^2/Hz$
 - b. 5 to 500Hz
 - c. Direction: 3 mutually perpendicular axis
 - d. Duration: 30 min/ axis
3. Check the mechanical and function during the test.

Pass Criteria:

1. No functional failures both during and after the test.
2. No performance degradation after the functional test.
3. No visual damage to the products during inspection, such as peeling, crack, missing pixels, discoloration, etc.

Basis for Profile: IEC 60068-2-64.

Test Result: **PASS**



Sample1



Sample2

5. Operation Shock Test

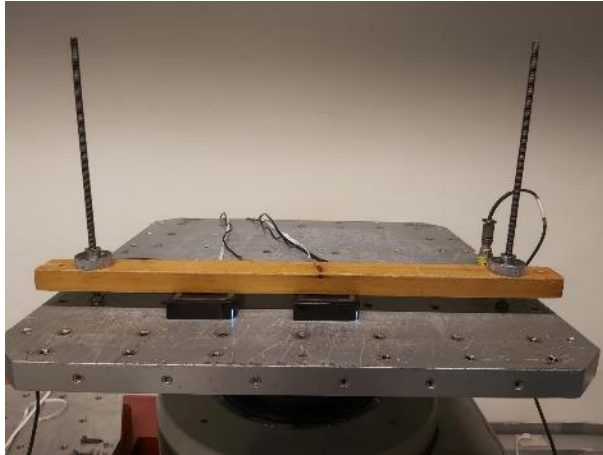
Purpose:

To reveal mechanical weakness and/or degradation in specified performance and to use this information, in conjunction with the relevant specification to decide whether a specimen is acceptable or not. To determine the structural integrity of specimens or as a means of quality control.

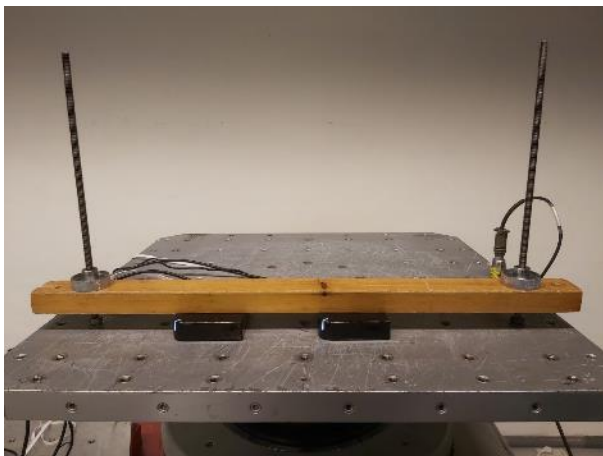
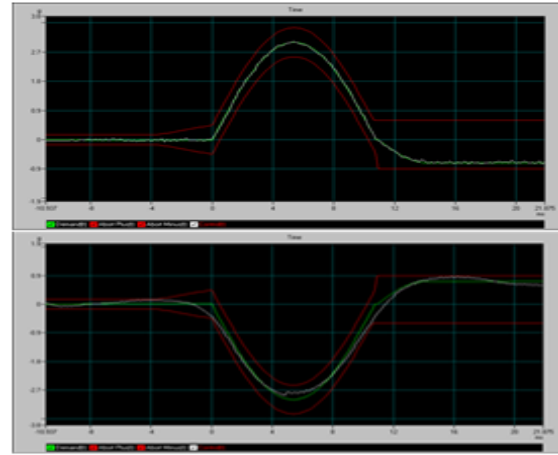
Quantity: 2 units (S/N: 2149688001202199000129, 2149688001202199000110)

Test Objective: Shock spectrum: Half sine, Duration: 11 ms, Acceleration: 30 m/s²
Direction of shocks: 6, Test duration: 6 x 3 shocks.

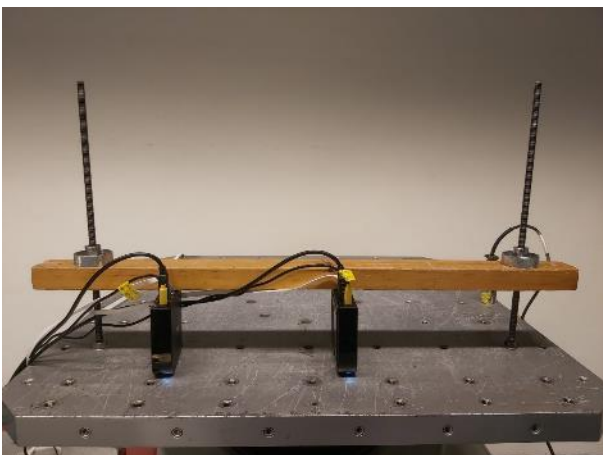
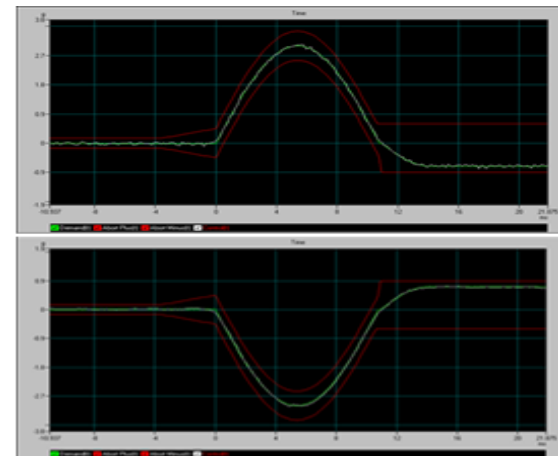
Test Profile:



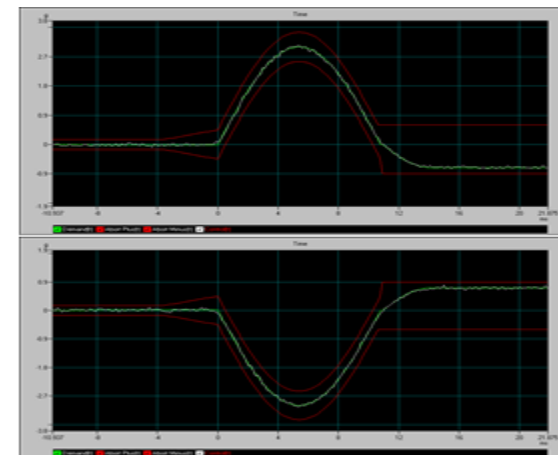
Bottom side

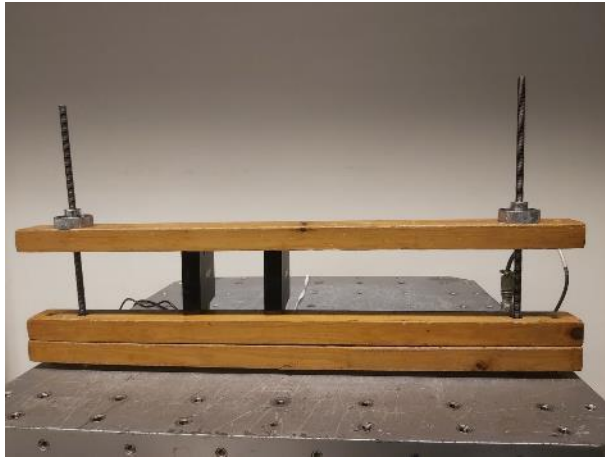


Top side

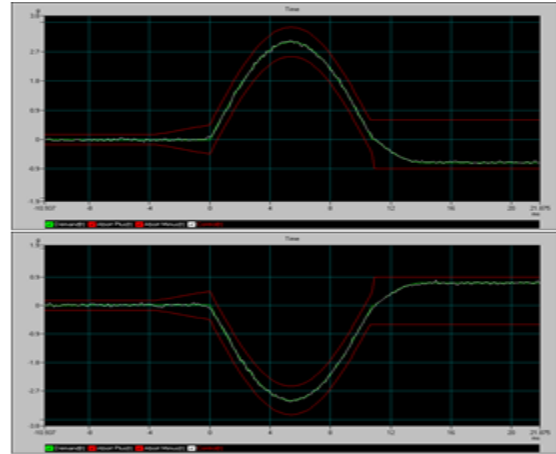


Front side

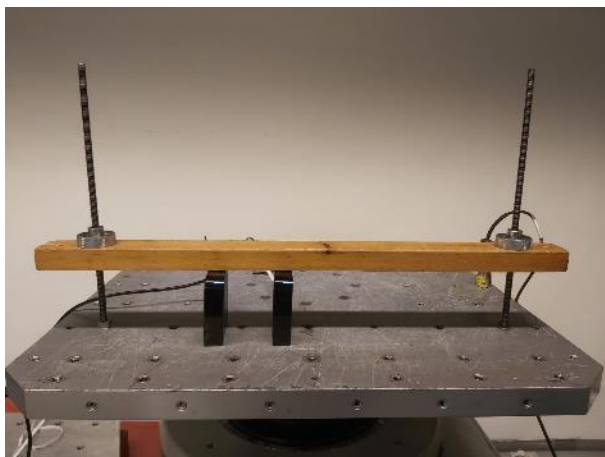
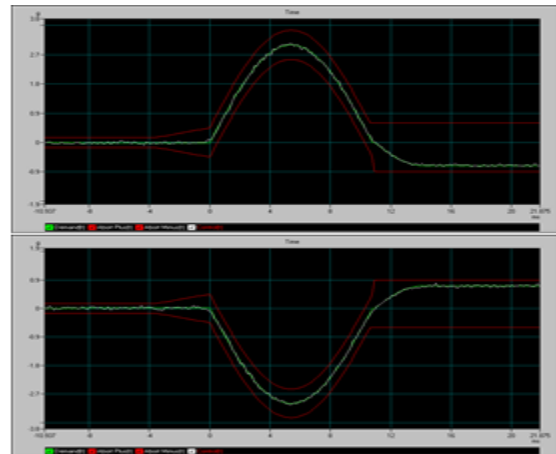




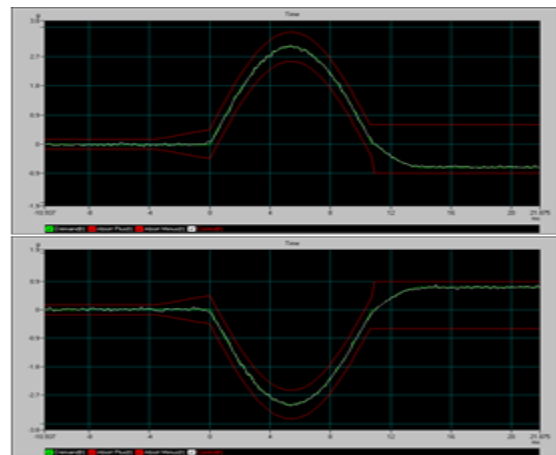
Rear side



Left side



Right side



Test Procedure:

- Set the product fully function operating.
1. Fix the product on shock mechanism.
2. Set the test program as above condition: Acceleration: 30 m/s².
3. Duration: 11 ms.
4. Test 6 faces, each direction test 3 times.
5. Check the mechanical and function during the test.

Pass Criteria:

1. No functional failures both during and after the test.
2. No performance degradation after the functional test.
3. No visual damage to the products during inspection, such as peeling, crack, missing pixels, discoloration, etc.

Basis for Profile: IEC 60068-2-27

Test Result: **PASS**



Sample1



Sample2

6. Drop test

Purpose:

To assess the effects on a specimen of simple standard test intended to be representative of the fall likely to be experience during rough handling, or to demonstrate a minimum degree of robustness, for the purpose of assessing safety requirements.

Quantity: 2 units (S/N: 2149688001202199000106, 2149688001202199000112)

Test Objective: Drop 75 cm, 1 fall on each face of the unit. (Steel plate).

1 DUT = 0.140Kg.

Test Profile:



Test Procedure:

1. Put the DUT on drop mechanism.
2. Drop 75 cm for six faces.
3. Check the mechanical and function after the test.

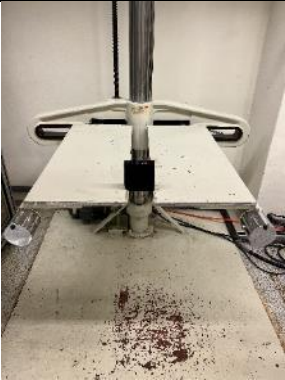
Pass Criteria:

1. No functional failures both during and after the test.
2. No performance degradation after the functional test.
3. No visual damage to the products during inspection, such as peeling, crack, missing pixels, discoloration, etc.

Basis for Profile: IEC 60068-2-32

Test Result: **PASS**

Item	Before Test	After Test	Test result
Top			Pass
Bottom			Pass
Right			Pass
Left			Pass

Front			Pass
Rear			Pass

PCB & Function Check:

	PCB		Function	Test result
Sample1			Pass	Pass
Sample2			Pass	Pass