

Mechanical Test Report

Equipment under Test (EUT): **D3236-S (D3236-S11)**

Applicant: FUJITSU TECHNOLOGY SOLUTIONS GmbH
FTS PDG WPS R&D OEM
Mr. Mertes, Wilbert
Bürgermeister-Ulrich-Strasse 100
86199 Augsburg

Document No.: MEC+1SB13-0020+M03

Test date: December 12, until December 13, 2013

Issue date: February 06, 2014

Result: Passed

Prepared by: Michael Röthinger
Technician



Signature

Reviewed by: Alexander Gerum
Deputy Head of LAB E



Signature

The results in this report apply only to the tested sample(s).
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Fujitsu Technology Solutions GmbH, Product Compliance Center, D-86199 Augsburg,
Bürgermeister-Ulrich-Str. 100, Germany, Phone (+49-821) 804-3692, Fax (+49-821) 804-2675.

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3. Summary of standards and results

The system was tested according to the applicable standards as referenced below.

3.1. Reason for qualification

Approval Measuring

3.2. Classification of mechanical conditions

Mechanical environmental conditions according to DIN EN 60721-3-5: 1997 test class 5M2.

Test specification:

Vibration sinusoidal, operating	According to DIN EN 60068-2-6 (Edition 10/08)	"Basic environmental testing procedure; Test Fc and guidance: Vibration, sinusoidal"
Vibration random, operating	According to DIN EN 60068-2-64 (Edition 04/09)	"Environmental testing; Part 2: test methods; Test Fh: Vibration , broad-band random (digitally controlled) and guidance"
Impact, operating	According to DIN EN 60068-2-27 (Edition 02/10)	"Basic environmental testing procedure; Part 2: Tests; Test Ea and guidance: shock"

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3.3. Test procedure

y-axis	Test
Vibration sinusoidal, operating	5.1
Vibration random, operating	5.2
Impact, operating II	5.4
Impact, operating I	5.3

↓

x-axis	Test
Vibration sinusoidal, operating	5.1
Vibration random, operating	5.2
Impact, operating I	5.3
Impact, operating II	5.4

↓

z-axis	Test
Vibration sinusoidal, operating	5.1
Vibration random, operating	5.2
Impact, operating I	5.3
Impact, operating II	5.4

↓

System test	Test
System test	5.5

Remark: After all tests a visual inspection was done (see 5.6 Visual inspection).

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3.4. Summary of results

3.4.1. Valued tests

	passed	failed
Vibration sinusoidal, operating, x-, y-, z-axis	X	
Vibration random, operating, x-, y-, z-axis	X	
Impact, operating I, x-, y-, z-axis	X	
Impact, operating II, x-, y-, z-axis	X	
System test	X	

Remark : The results are only applicable for the tested configuration.

3.4.2. Acceleration values

3.4.2.1. Vibration sinusoidal, operating

	Shaker ref. value [G]	X-axis		Heatpipe Y-axis		Z-axis	
		a [G]	f [Hz]	a [G]	f [Hz]	a [G]	f [Hz]
Vibration X-axis	1,5	6,4	201 Hz	2,8	401 Hz	7,6	74 Hz
		427%		187%		507%	
Vibration Y-axis	1,5	1,3	207 Hz	6,3	135 Hz	2,1	74 Hz
		87%		420%		140%	
Vibration Z-axis	1,5	3,7	187 Hz	2,1	396 Hz	3,8	185 Hz
		247%		140%		253%	

3.4.2.2. Vibration random, operating

RMS [G]	Shaker ref. value	Heatpipe		
		X-axis	Y-axis	Z-axis
Vibration X-Axis	1,71	1,62	0,77	2,12
		95%	45%	124%
Vibration Y-Axis	1,71	0,81	3,43	0,66
		47%	201%	39%
Vibration Z-Axis	1,71	3,15	1,02	4,13
		185%	59%	242%

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3.4.2.3. Impact, operating I

a [G]	Shaker ref. value	Heatpipe		
		X-axis	Y-axis	Z-axis
Impact	10,0	12,5	8,4	16,4
X-axis		125%	84%	164%
Impact	10,0	3,6	14,9	2,3
Y-axis		36%	149%	23%
Impact	10,0	4,3	5,8	10,8
Z-axis		43%	58%	108%

3.4.2.4. Impact, operating II

a [G]	Shaker ref. value	Heatpipe		
		X-axis	Y-axis	Z-axis
Impact	30,0	44,5	37,4	52,1
X-axis		148%	125%	174%
Impact	30,0	13,4	50,1	10,2
Y-axis		45%	167%	34%
Impact	30,0	21,1	16,7	36,1
Z-axis		70%	56%	120%

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3.5. Table of used instruments

Vibration generator

Test-/Measure device	Equipment name			Check (Ch) / Calibration (C)	
	Manu- facturer	Type	Serial-No.	last	next
Shaker	RMS	SW8200	5751	08.13Ch	02.14Ch
Power amplifier	RMS	TGA12016	5751	08.13Ch	02.14Ch
Shaker control system	M+P	VP8	B080064 B080078	08.13Ch	02.14Ch
Shaker software	M+P	VcpNT Revision 2.10.36	--	not necessary	not necessary
Accelerometer (vertical table)	Endevco	7701-50	DL28	12.13C	12.14C
Accelerometer (vertical heavy-load table)	B & K	4370	1921852	12.13C	12.14C
Accelerometer (horizontal-(slide) table)	Endevco	7702A-50	11455	12.13C	12.14C
Charge amplifier (8x)	UD	CVA-8	214	11.13C	11.14C
Slide table (horizontal) (81 kg)	RMS	SWT 4333/1	5931	not necessary	not necessary

Used accelerometers / EUT measure points

Instruments	Equipment name			Check (Ch) / Calibration (C)	
	Manu- facturer	Type	Serial-No.	last	next
1 Accelerometer attached to the Heatpipe	PCB	356A01	LW124683	12.13C	12.14C

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4. Equipment under test

4.1. System description

Product: D3236-S11
 Manufacturer: Fujitsu Technology Solutions GmbH
 Type: system board
 Approval name: D3236-S

Part no.: S26361-D3236-S11
 Serial no.: Pre-Production Sample

Component	Model	Manufacturer	Part no.	Serial no.	Rev.	Remark
System board	D3236-S11	Fujitsu Technology Solutions GmbH	S26361-D3236-S11	42020811	GS60	2 x SO-DIMM, 1 x mSATA Module

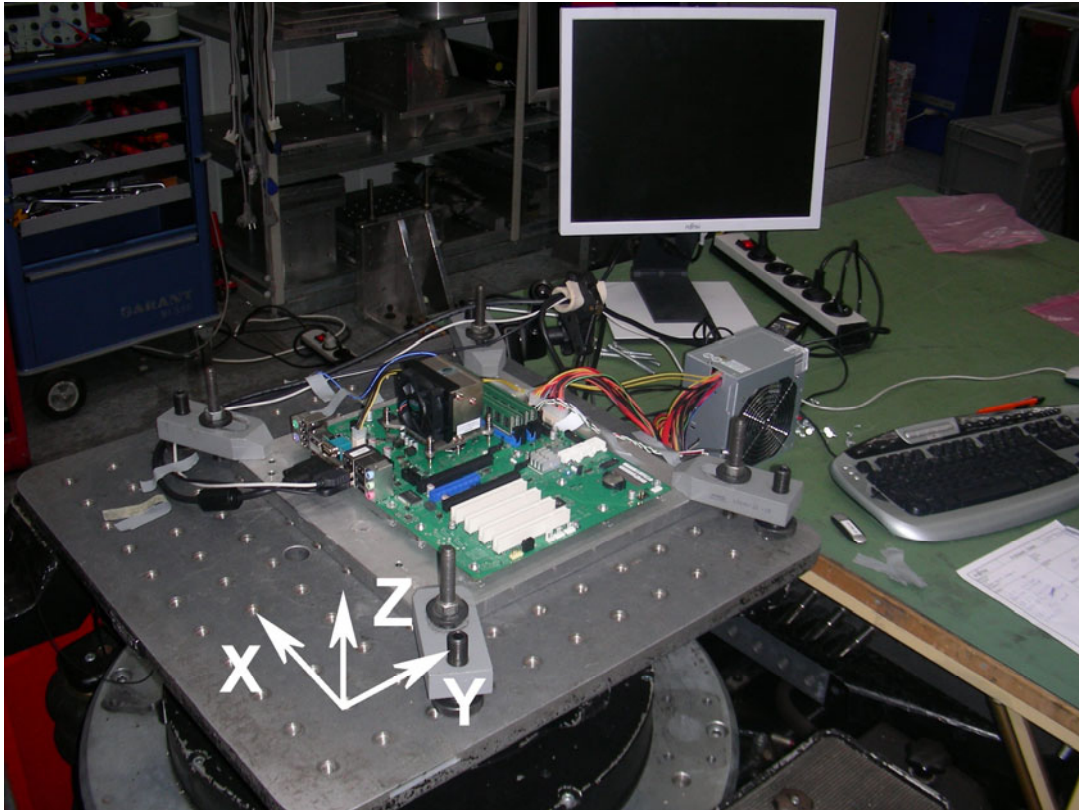
Receipt date: November 21, 2013
Condition when received: ready for test

4.2. Environmental conditions

Temperature: 21°C +/- 2°C
 Relative Humidity: 50%...+/- 20%
 Barometric Pressure: 1013 hPa +/-15 hPa

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4.3. Test specification



Function test: Systest 32-Bit V 3.00.253

EUT fixing: The EUT was fixed to the vibration table with metal fixings (see photo above).

Measuring points:

No.	Axis	Sensor type	Position
1	x,y,z	356A01	top side of the Heatpipe

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5. Test results

5.1. Vibration sinusoidal, operating

	passed	failed
Vibration sinusoidal, operating x-axis	X	
Vibration sinusoidal, operating y-axis	X	
Vibration sinusoidal, operating z-axis	X	

Test specification: According to DIN EN 60721-3-5: 1997 test class 5M2

Standard: According to "Basic environmental testing procedure;
DIN EN 60068-2-6 Test Fc and guidance: Vibration, sinusoidal"
(Edition 10/08)

Vibration severity: Vibration (sinusoidal):
 2 - 9 Hz: 3,3 mm
 9 - 200 Hz: 1 g
 200 - 500 Hz: 1,5 g
 Duration: 4 sweep
 (2 sweep = 1 cycle = 2 Hz to 500 Hz to 2 Hz)
 start frequency: 2 Hz

 sweep rate: 1 Oct/min.

Requirements: No damage and errors allowed during vibration test.

Function test: Systest 32-Bit V 3.00.253

Test results:

Test No.	Axis	Component	Test program	Test cycles	Results
1	x	Heatpipe	-	4 sweep	passed, results according to fig. 1, page 11
2	y	Heatpipe	-	4 sweep	passed, results according to fig. 2, page 11
3	z	Heatpipe	-	4 sweep	passed, results according to fig. 3, page 12

Remark:

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Fig. 1 Vibration sinusoidal, operating x-axis

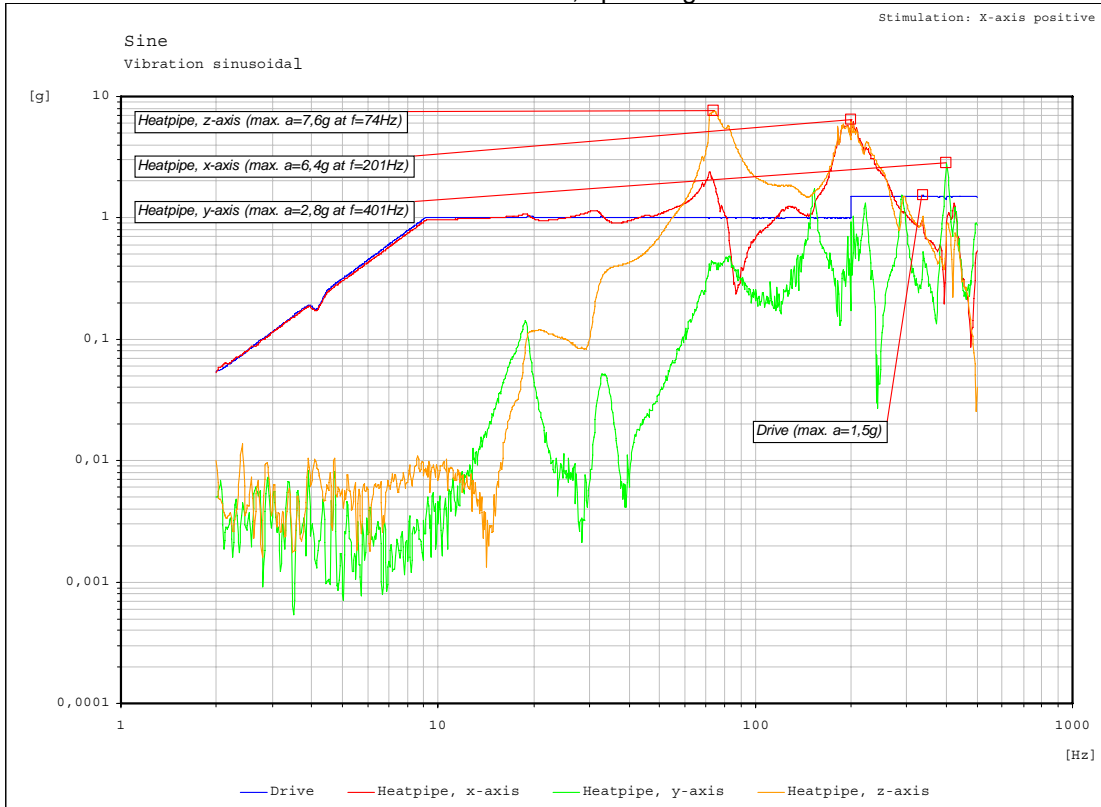
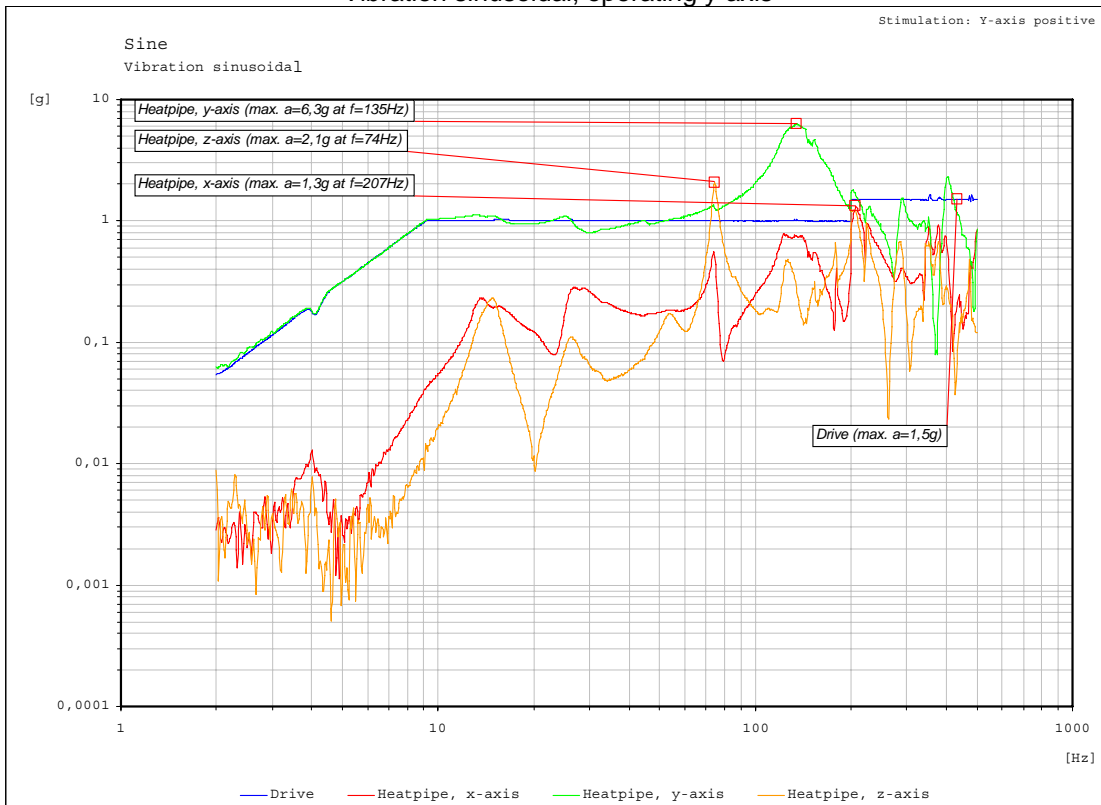
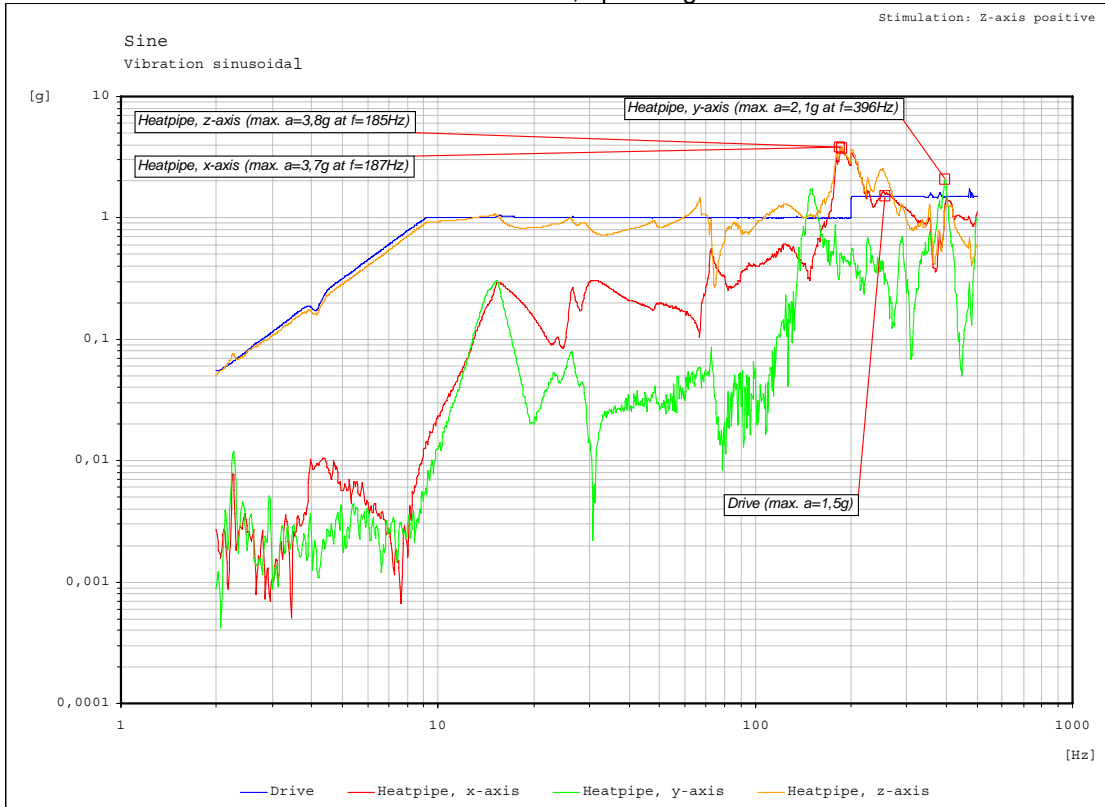


Fig. 2 Vibration sinusoidal, operating y-axis



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Fig. 3 Vibration sinusoidal, operating z-axis



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5.2. Vibration random, operating

	passed	failed
Vibration random, operating x-axis	X	
Vibration random, operating y-axis	X	
Vibration random, operating z-axis	X	

Test specification: According to DIN EN 60721-3-5: 1997 test class 5M2

Standard: According to DIN EN 60068-2-64 (Edition 04/09) "Environmental testing; Part 2: test methods; Test Fh: Vibration , broad-band random (digitally controlled) and guidance"

Vibration severity: Vibration random operating:
 10 - 200 Hz: 1 m/s²
 30 - 200 Hz: 0,3 m/s²
 Effective value aeff: 16,74 m/s²
 Duration per axis: 30 minutes

Requirements: No damage and errors allowed during vibration test.

Function test: Systest 32-Bit V 3.00.253

Test results:

Test No.	Axis	Component	Test program	Endurance	Results
1	x	Heatpipe	-	30 min.	passed, results according to fig. 1, page 11
2	y	Heatpipe	-	30 min.	passed, results according to fig. 2, page 11
3	z	Heatpipe	-	30 min.	passed, results according to fig. 3, page 12

Remark:

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5.3. Impact, operating I

	passed	failed
Impact, operating x-axis (pos./neg. direction)	X	
Impact, operating y-axis (pos./neg. direction)	X	
Impact, operating z-axis (pos./neg. direction)	X	

Test specification: According to DIN EN 60721-3-5: 1997 test class 5M2

Standard: According to DIN EN 60068-2-27 (Edition 02/10) "Basic environmental testing procedure; Part 2: Tests; Test Ea and guidance: shock"

Severity: Impact operating:
Pulse shape: half sine
Acceleration: 100 m/s²
Duration: 11 ms
Number: 50 impacts per direction
Totally number: 300 impacts
Time between pulse: 1 s

Requirements: No damage and errors allowed during impact test.

Function test: Systest 32-Bit V 3.00.253

Test results:

Test No.	Axis	Component	Test program	Test cycles	Results
1	x	Heatpipe	-	+50/-50 impact	passed, results according to fig. 1 and 2, page 15
2	y	Heatpipe	-	+50/-50 impact	passed, results according to fig. 3 and 4, page 16
3	z	Heatpipe	-	+50/-50 impact	passed, results according to fig. 5 and 6, page 17

Remark:

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Fig. 1 Impact, operating x-axis

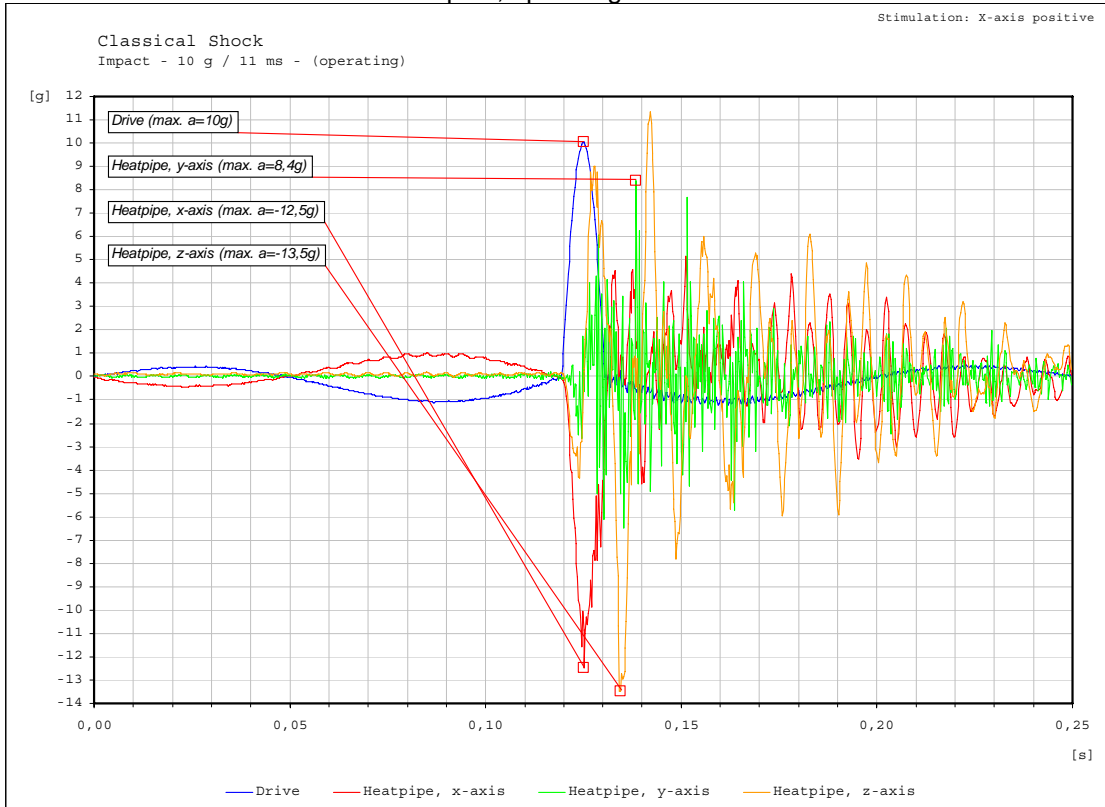


Fig. 2 Impact, operating x-axis



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Fig. 3 Impact, operating y-axis

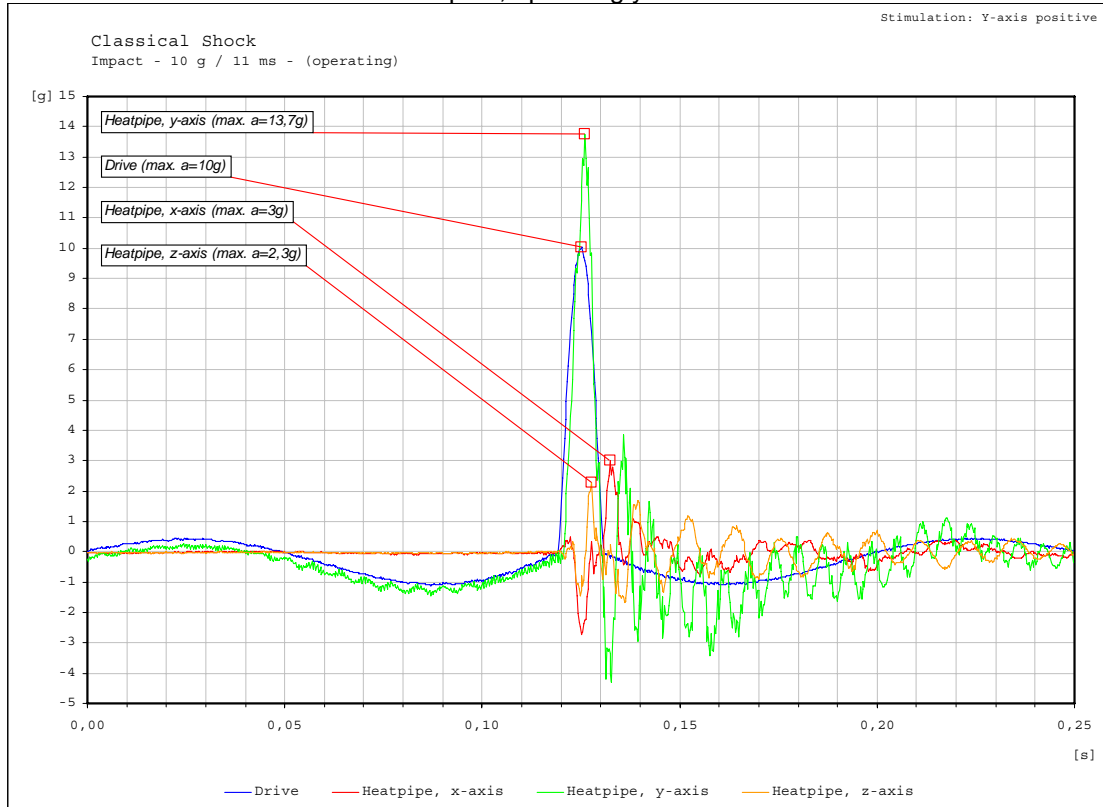


Fig. 4 Impact, operating y-axis



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Fig. 5 Impact, operating z-axis

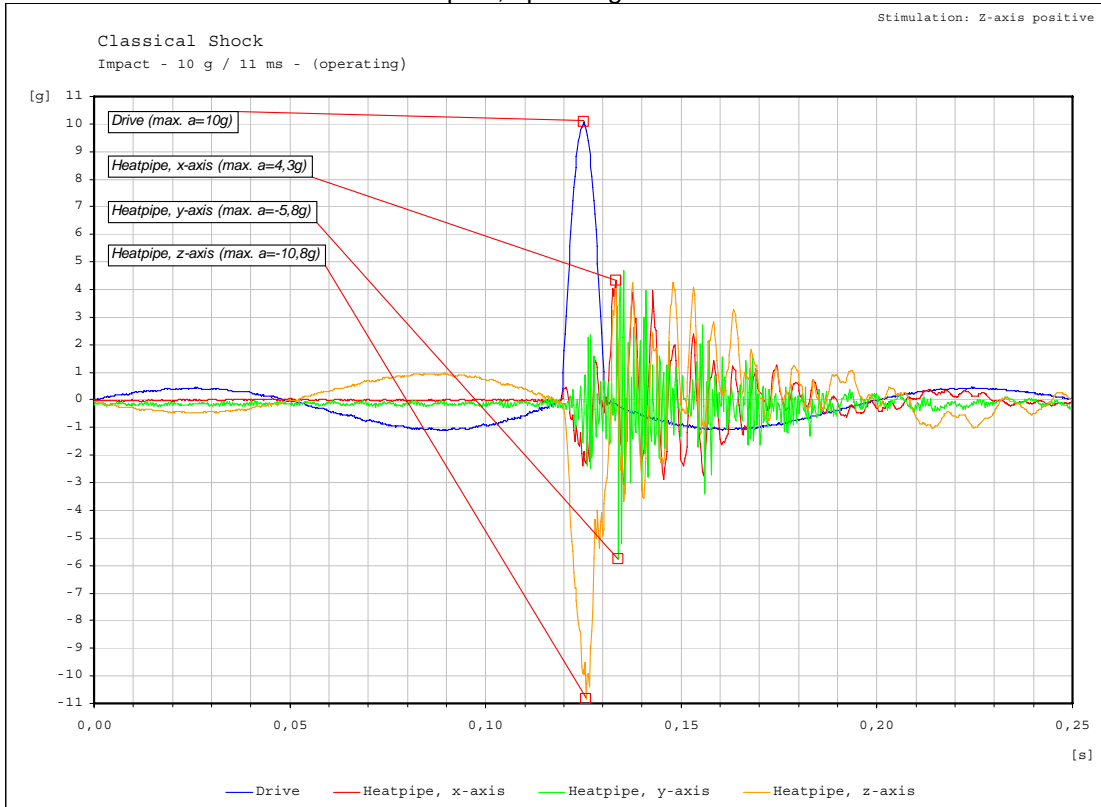
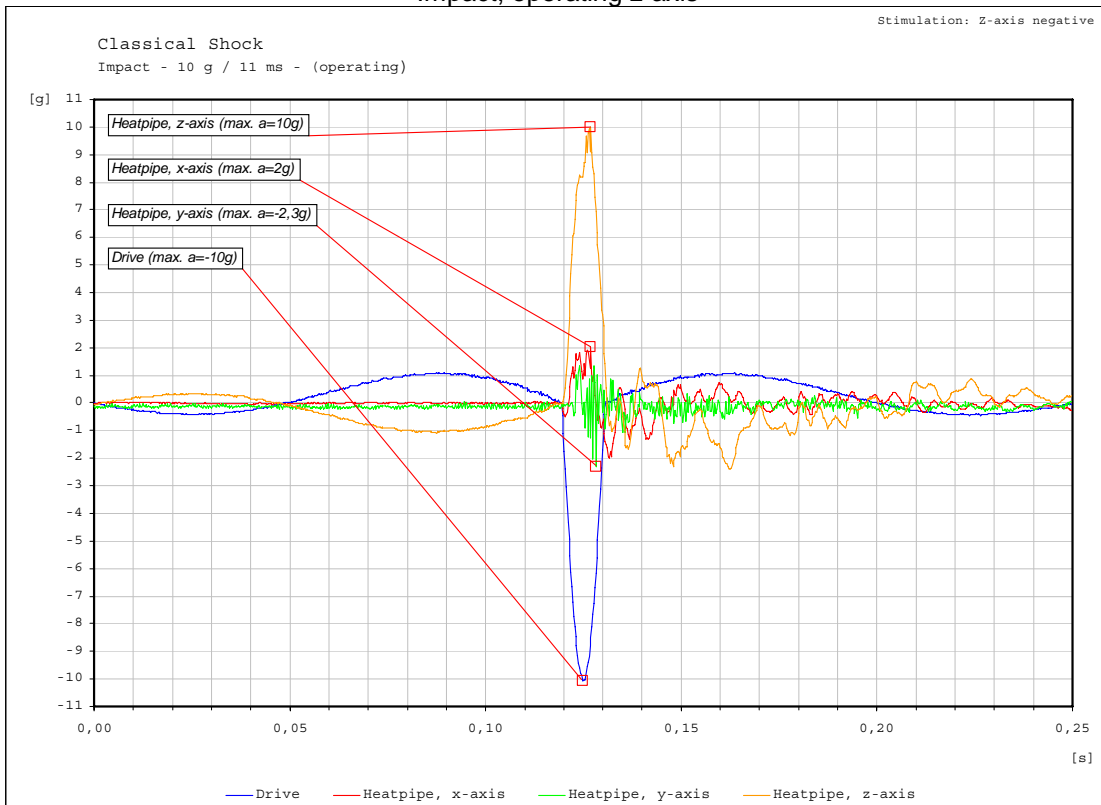


Fig. 6 Impact, operating z-axis



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5.4. Impact, operating II

	passed	failed
Impact, operating x-axis (pos./neg. direction)	X	
Impact, operating y-axis (pos./neg. direction)	X	
Impact, operating z-axis (pos./neg. direction)	X	

Test specification: According to DIN EN 60721-3-5: 1997 test class 5M2

Standard: According to DIN EN 60068-2-27 (Edition 02/10) "Basic environmental testing procedure; Part 2: Tests; Test Ea and guidance: shock"

Severity: Impact operating:
Pulse shape: half sine
Acceleration: 300 m/s²
Duration: 6 ms
Number: 50 impacts per direction
Totally number: 300 impacts
Time between pulse: 3 s

Requirements: No damage and errors allowed during impact test.

Function test: Systest 32-Bit V 3.00.253

Test results:

Test No.	Axis	Component	Test program	Test cycles	Results
1	x	Heatpipe	-	+50/-50 impact	passed, results according to fig. 1 and 2, page 19
2	y	Heatpipe	-	+50/-50 impact	passed, results according to fig. 3 and 4, page 20
3	z	Heatpipe	-	+50/-50 impact	passed, results according to fig. 5 and 6, page 21

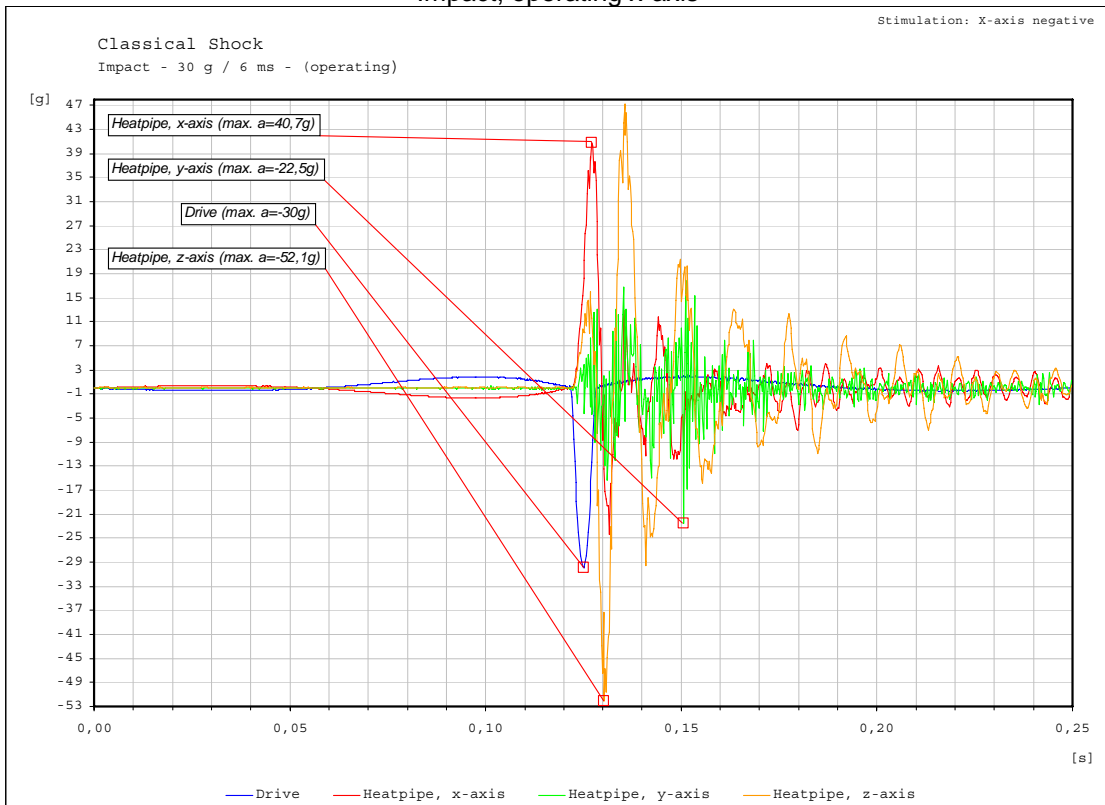
Remark:

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Fig. 1 Impact, operating x-axis



Fig. 2 Impact, operating x-axis



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Fig. 3 Impact, operating y-axis

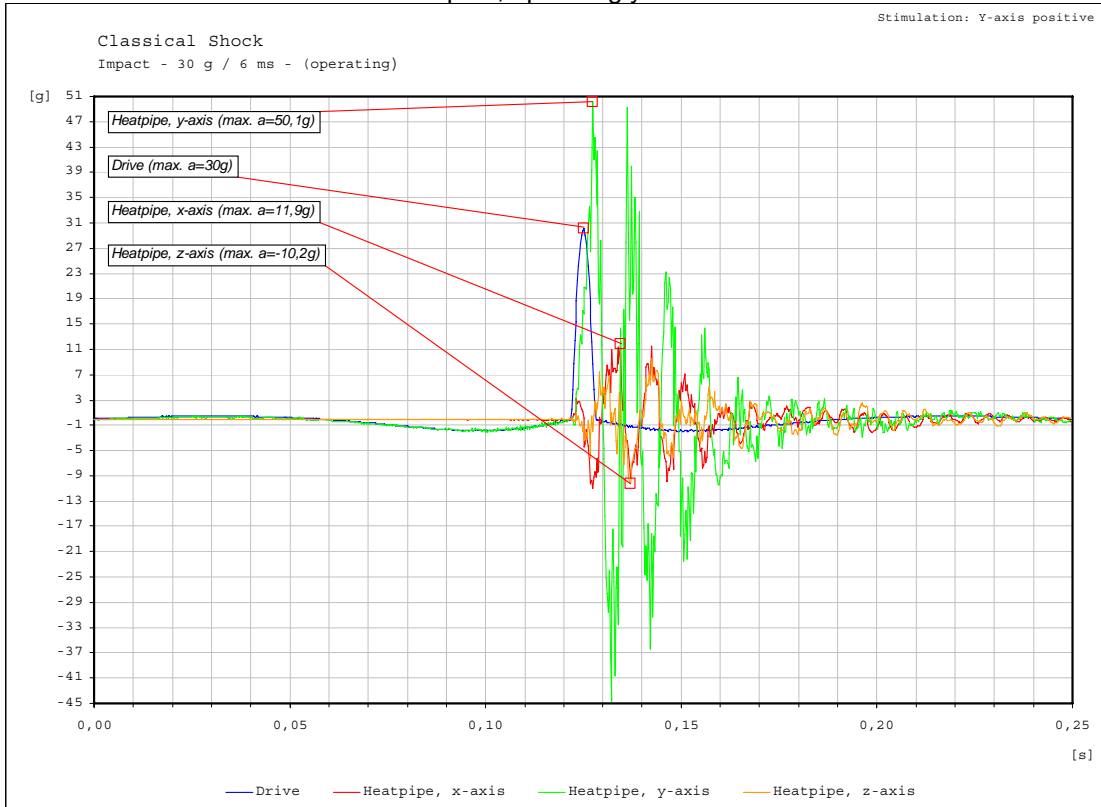


Fig. 4 Impact, operating y-axis



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Fig. 5 Impact, operating z-axis

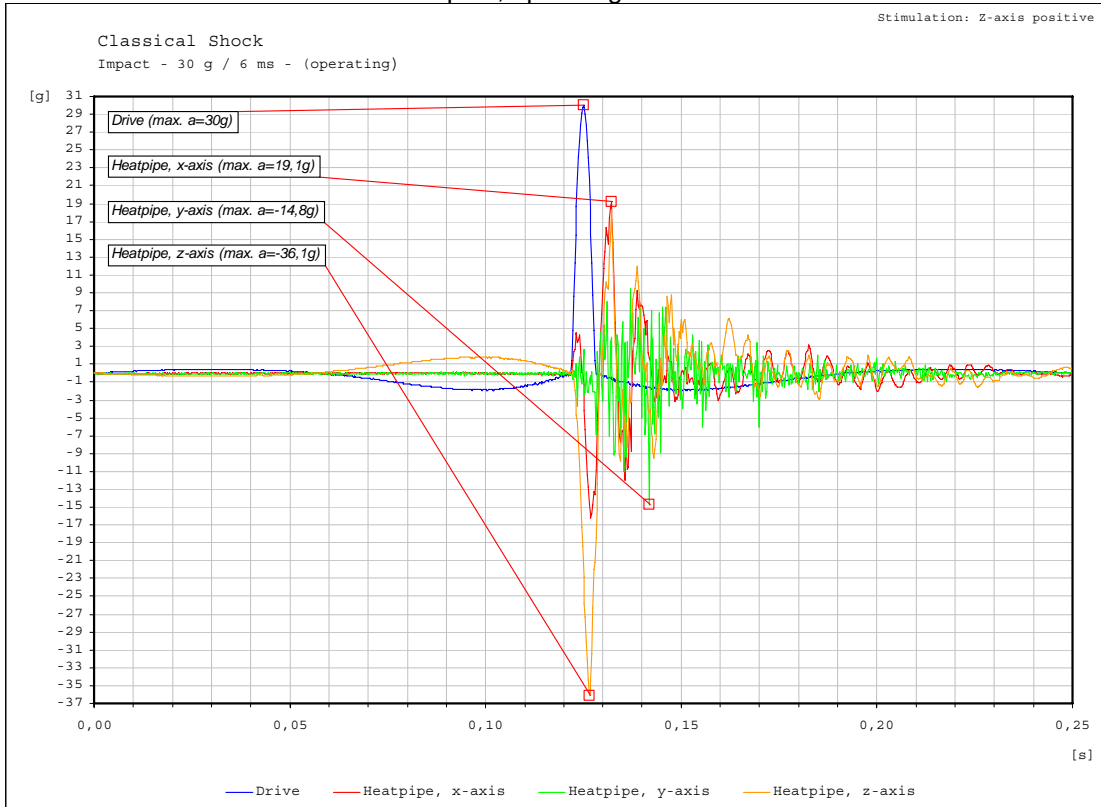
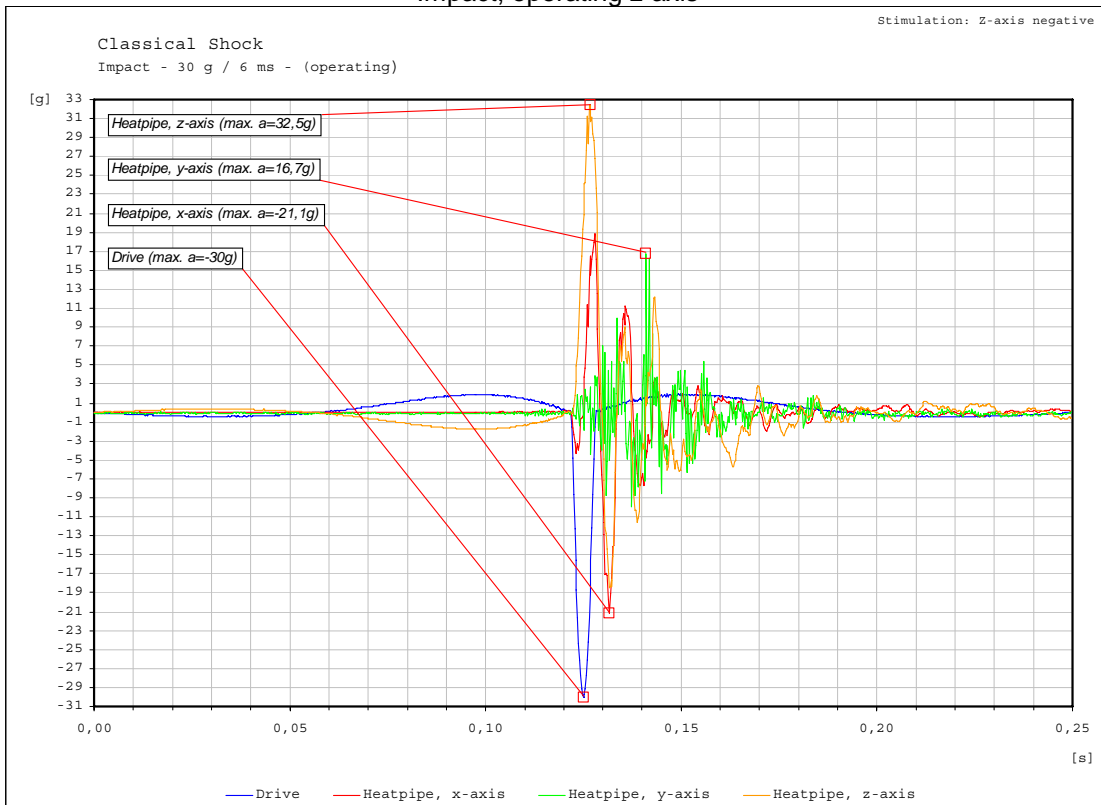


Fig. 6 Impact, operating z-axis



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5.5. System test

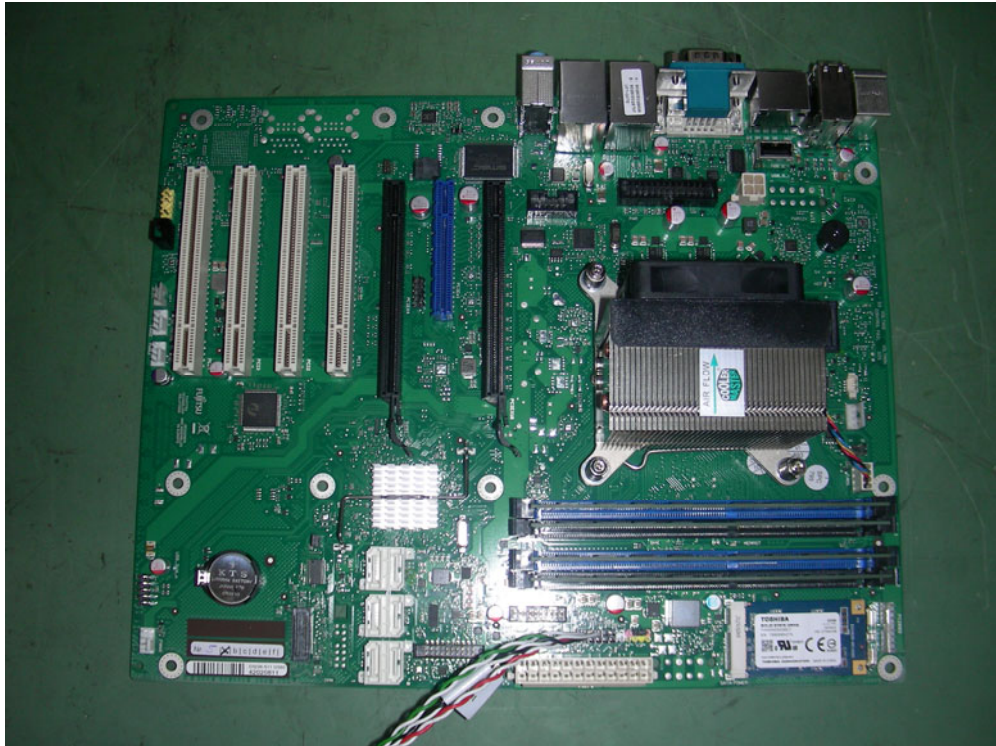
	passed	failed
System test	X	

5.6. Visual inspection

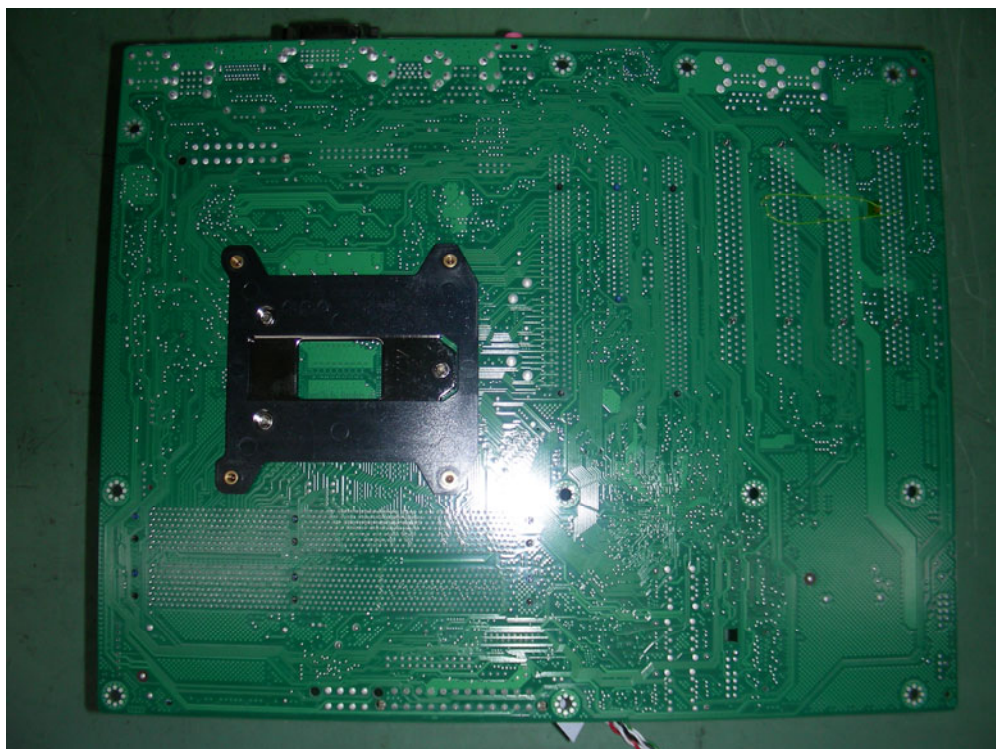
The EUT with all its components passed without any damage.

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6. EUT-Photos

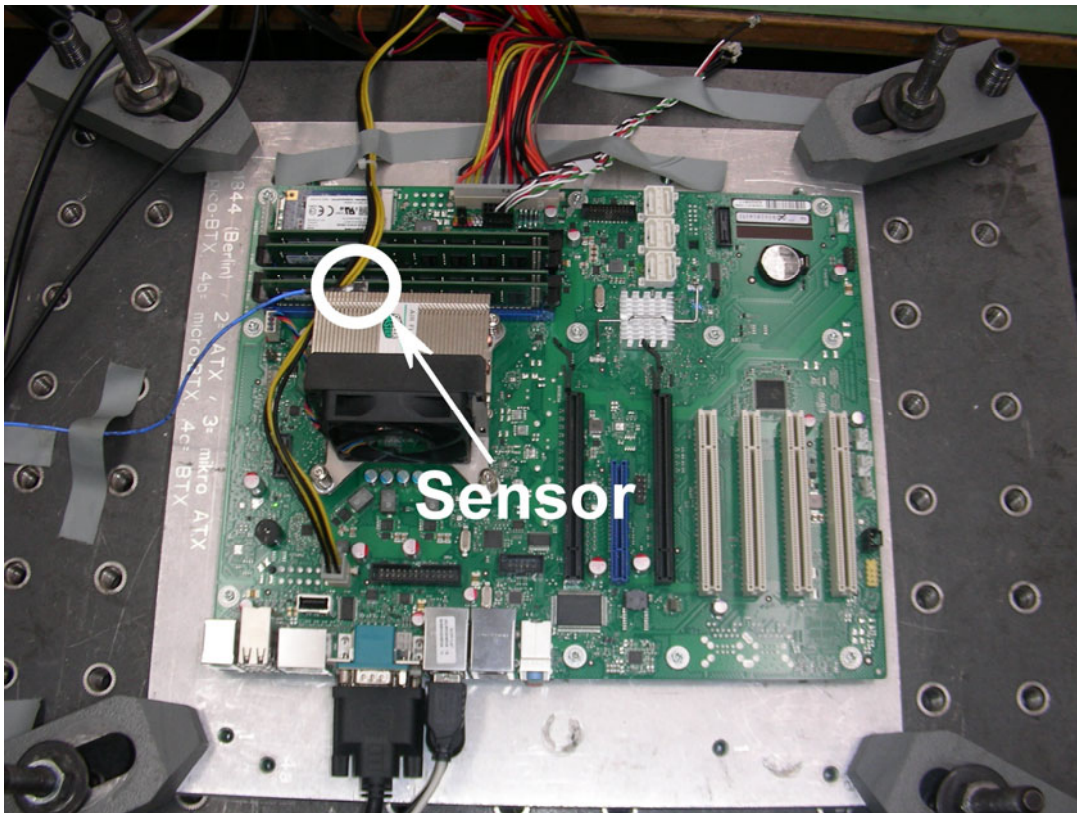


Picture no. 1: Top side of EUT

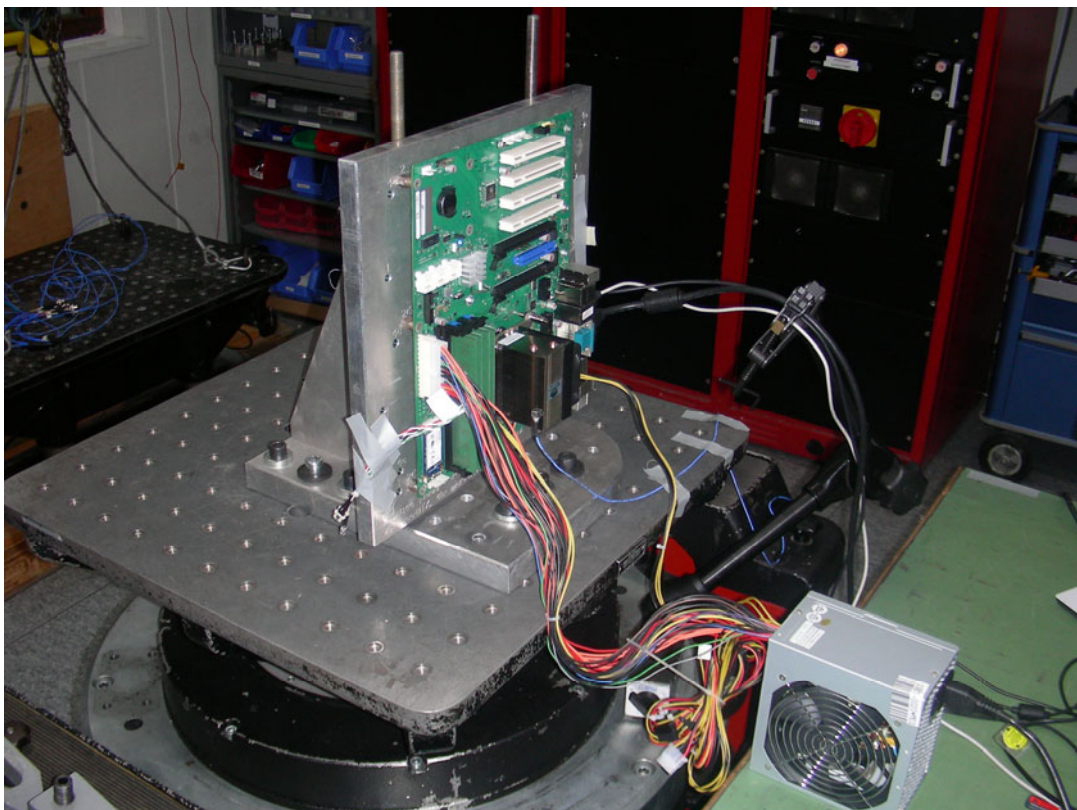


Picture no. 2: Bottom side of EUT

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Picture no. 3: Measuring point no. 1 (heatsink)



Picture no. 4: EUT on x-axis