FUJITSU

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Product Compliance Center

Mechanical Test Report

Equipment under Test (EUT):	**D3313-S (D3313-S22)**
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+M02
Test date:	January 27, until January 29, 2014
Issue date:	February 05, 2014
Result:	Passed

Prepared by:	Michael Röthinger Technician	 Signature
Reviewed by:	Alexander Gerum Deputy Head of LAB E	 Signature

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2. Table of contents

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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

		Heatpipe					
	Shaker	X-axis		Y-axis		Z-axis	
	ref. value [G]	a [G]	f [Hz]	a [G]	f [Hz]	a [G]	f [Hz]
Vibration X-axis	1,5	3,7 247%	368 Hz	3,9 260%	399 Hz	3,6 240%	70 Hz
Vibration Y-axis	1,5	9,9 660%	68 Hz	3,7 247%	368 Hz	2,7 180%	386 Hz
Vibration Z-axis	1,5	5,6 373%	68 Hz	2,1 140%	430 Hz	22,2 1480%	68 Hz

3.4.2.2. Vibration random, operating

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

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3.4.2.3. Impact, operating I

a [G]		Heatpipe		
	Shaker ref. value	X-axis	Y-axis	Z-axis
Impact X-axis	10,0	5,8 58%	4,3 43%	10,8 108%
Impact Y-axis	10,0	3,5 35%	14,5 145%	2,3 23%
Impact Z-axis	10,0	12,3 123%	9,4 94%	16,7 167%

3.4.2.4. Impact, operating II

a [G]		Heatpipe		
	Shaker ref. value	X-axis	Y-axis	Z-axis
Impact X-axis	30,0	36,0 120%	13,5 45%	19,5 65%
Impact Y-axis	30,0	5,4 18%	36,1 120%	20,7 69%
Impact Z-axis	30,0	18,6 62%	10,8 36%	60,7 202%

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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:	D3313-S22
Manufacturer:	Fujitsu Technology Solutions GmbH
Type:	system board
Approval name:	D3313-S

Part no.:	S26361-D3313-S22
Serial no.:	Pre-Production Sample

Component	Model	Manufacturer	Part no.	Serial no.	Rev.	Remark
System board	D3313-S22	Fujitsu Technology Solutions GmbH	S26361-D3003-S21	43468050	GS51	2 x SO-DIMM, 1 x mSATA Module

Receipt date: January 15, 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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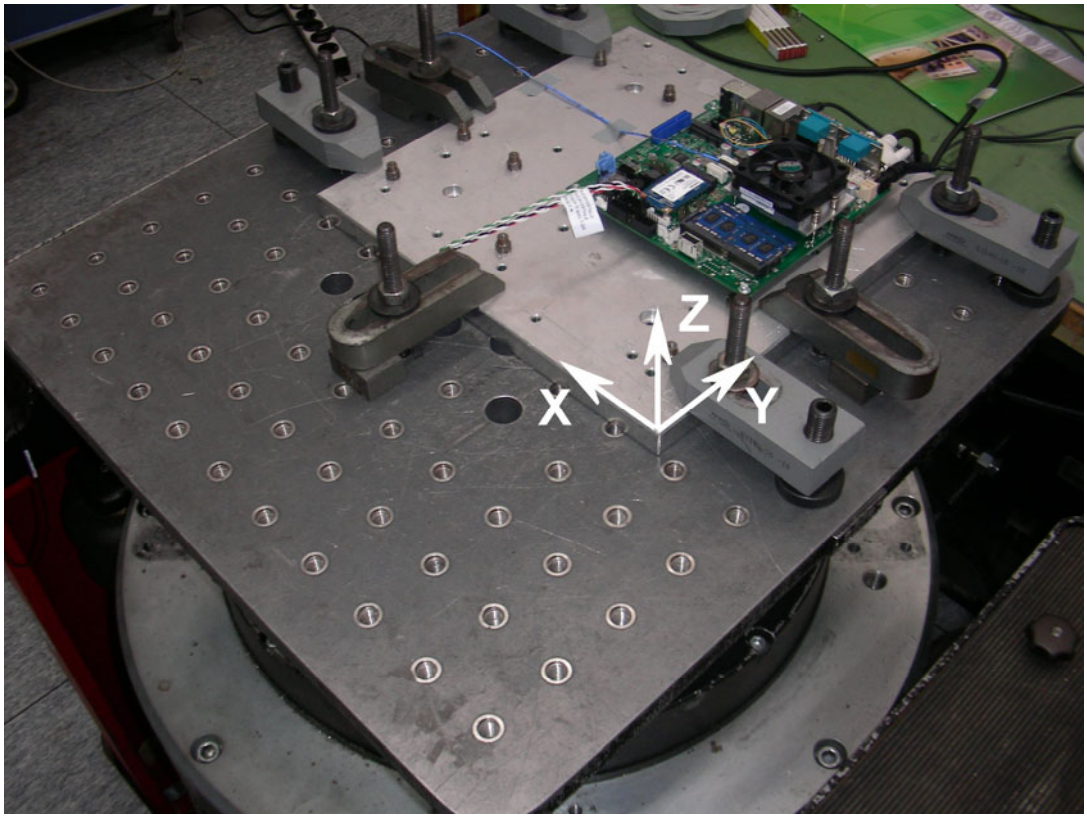
4.3. Test specification



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

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

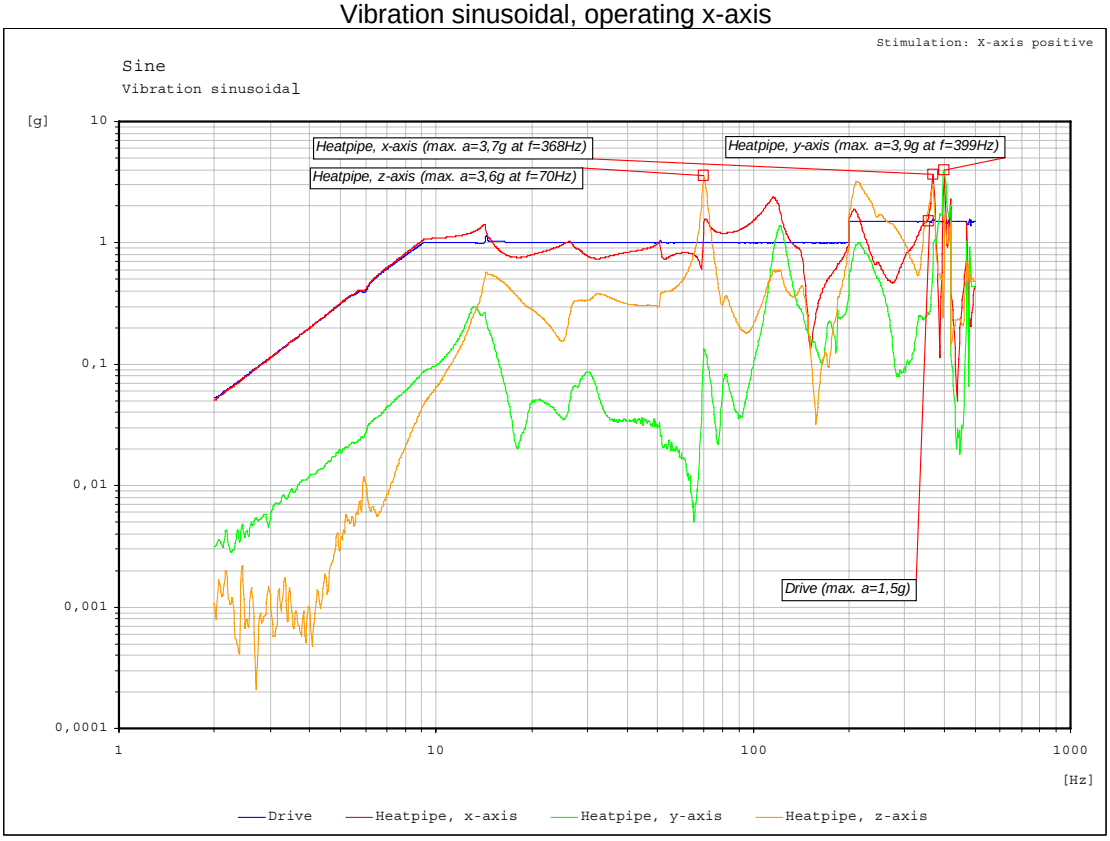

Fig. 2 Vibration sinusoidal, operating y-axis

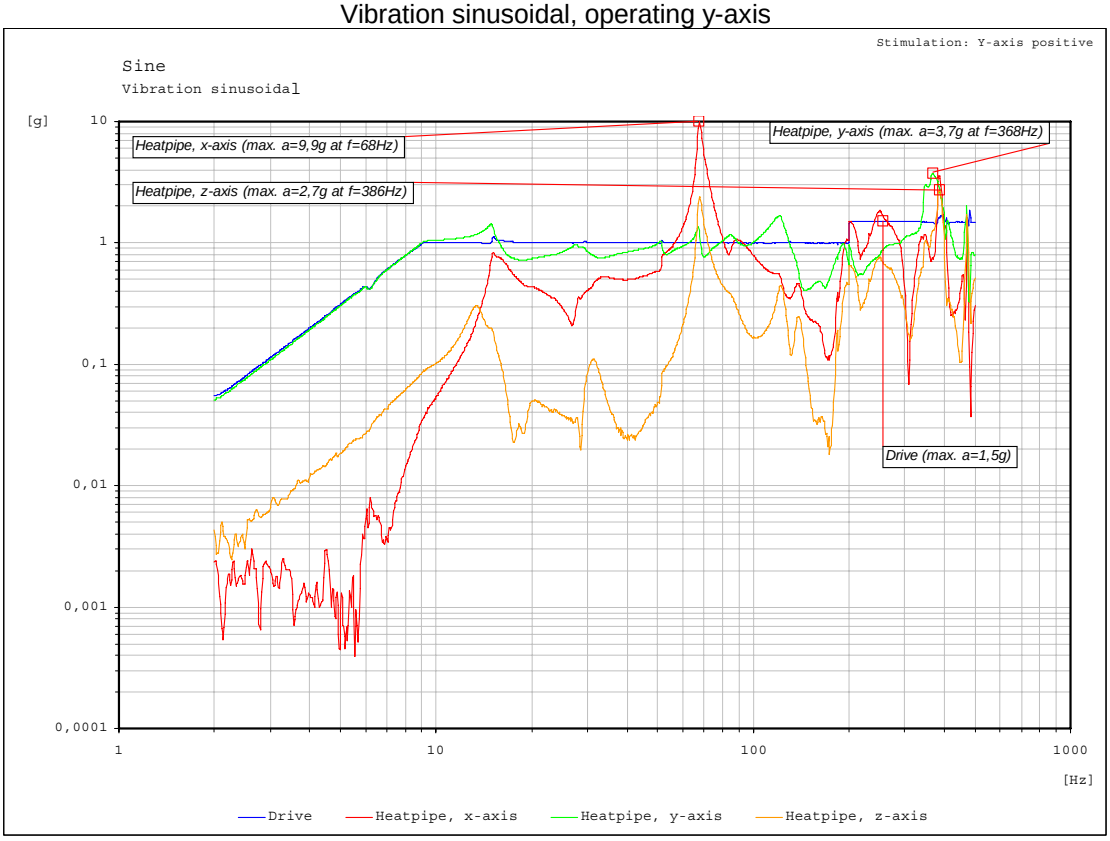

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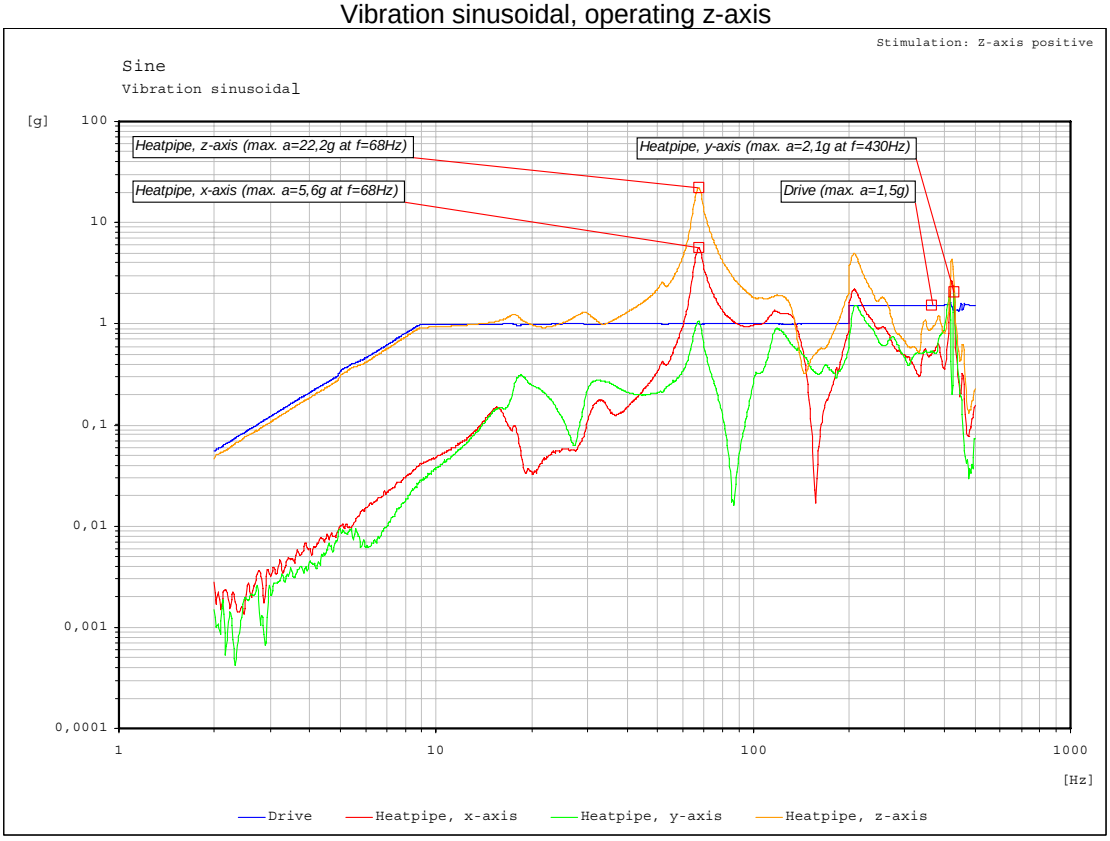
Fig. 3 Vibration sinusoidal, operating z-axis



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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	Endu-rance	Results
1	x	Heatpipe	-	30 min.	passed, results according to fig. 1, page 12
2	y	Heatpipe	-	30 min.	passed, results according to fig. 2, page 13
3	z	Heatpipe	-	30 min.	passed, results according to fig. 3, page 14

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

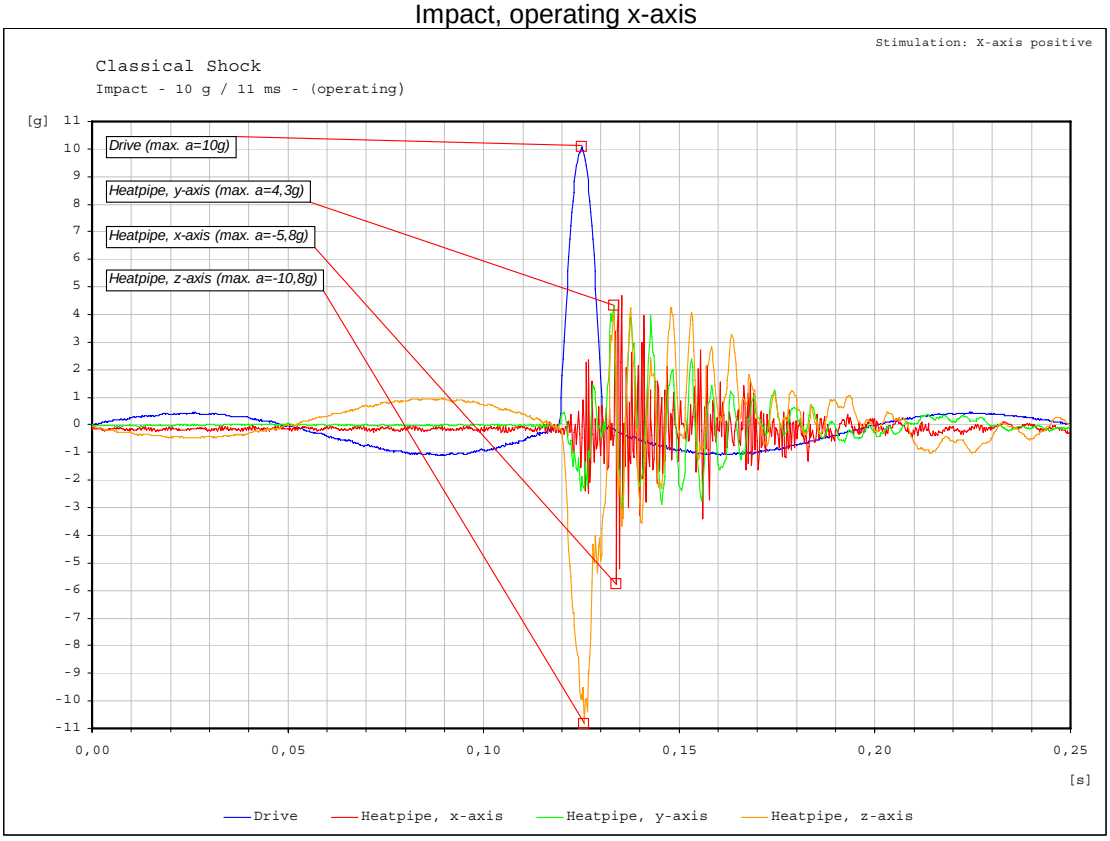

Fig. 2 Impact, operating x-axis

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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

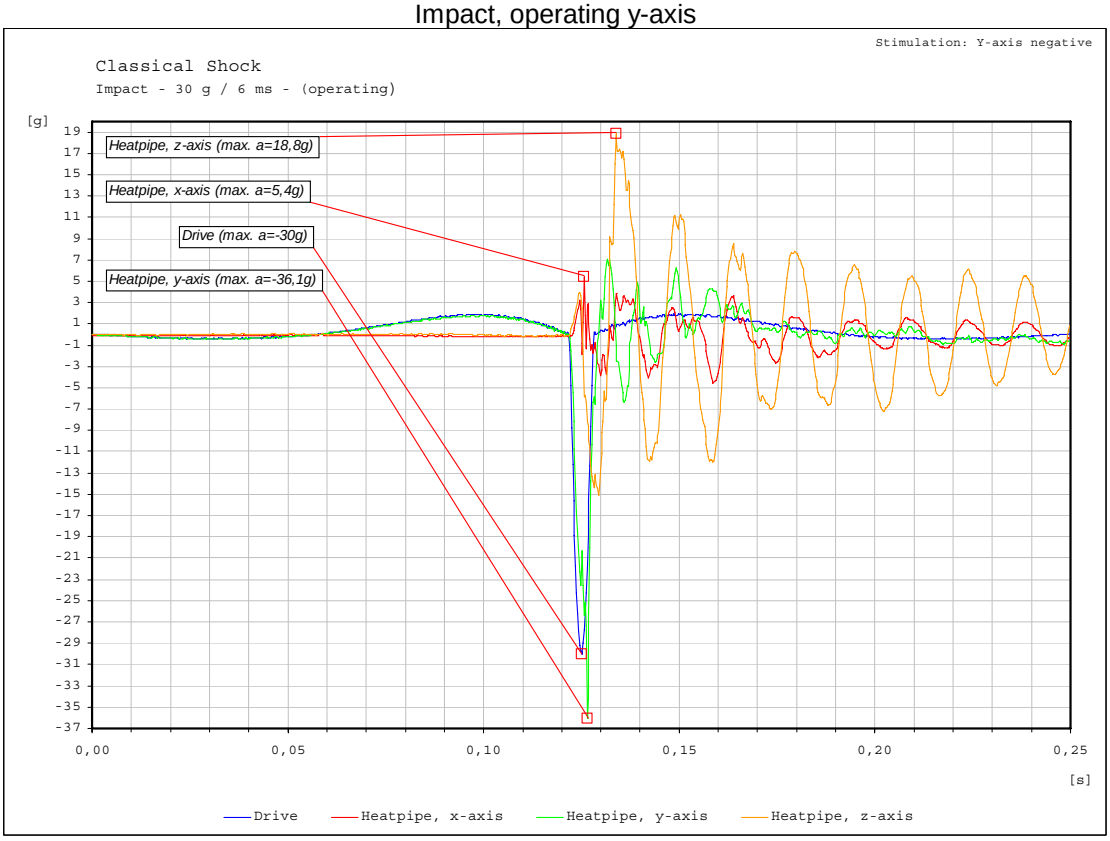

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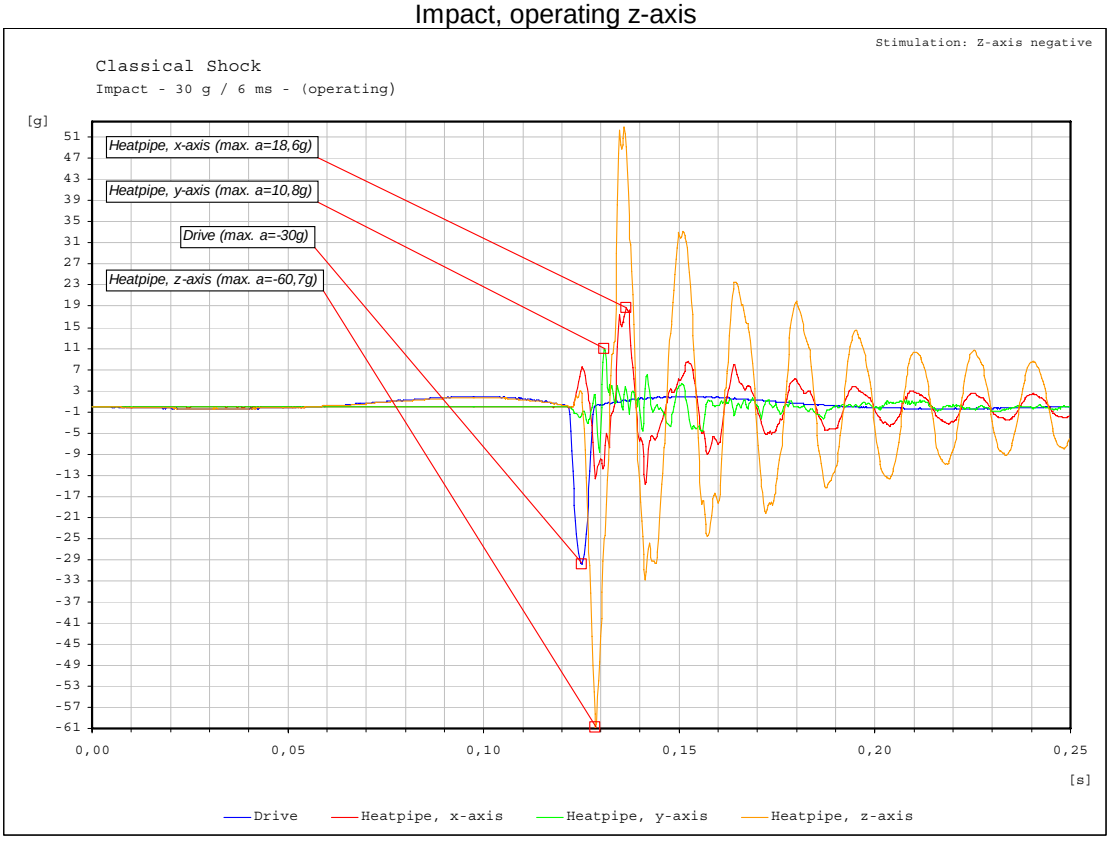
Fig. 5 Impact, operating z-axis

Fig. 6 Impact, operating z-axis



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5.5. System test

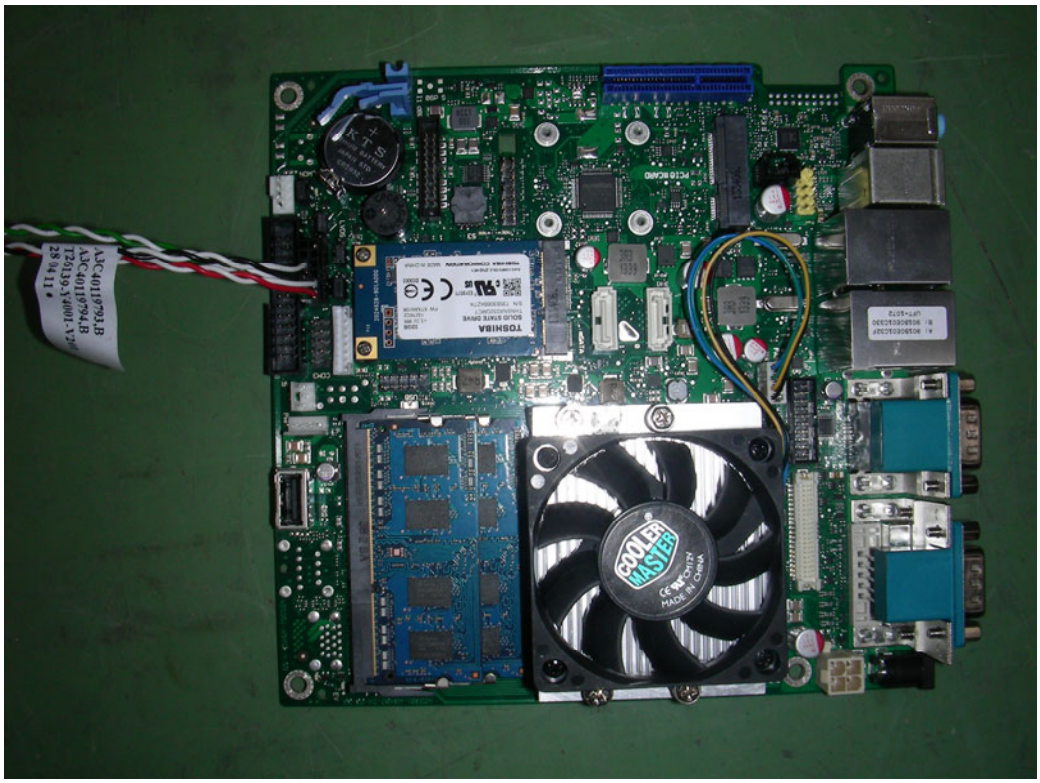
	passed	failed
System test	X	

5.6. Visual inspection

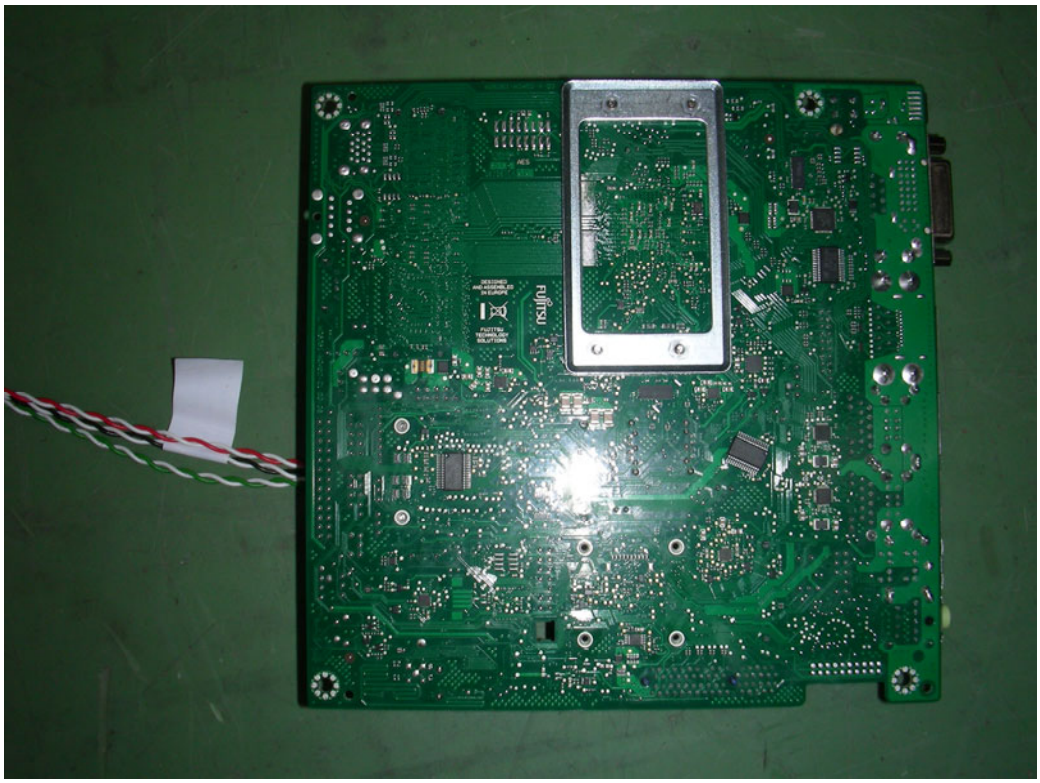
The EUT with all its components passed without any damage.

EUT : D3313-S (D3313-S22)

6. EUT-Photos



Picture no. 1: Top side of EUT



Picture no. 2: Bottom side of EUT

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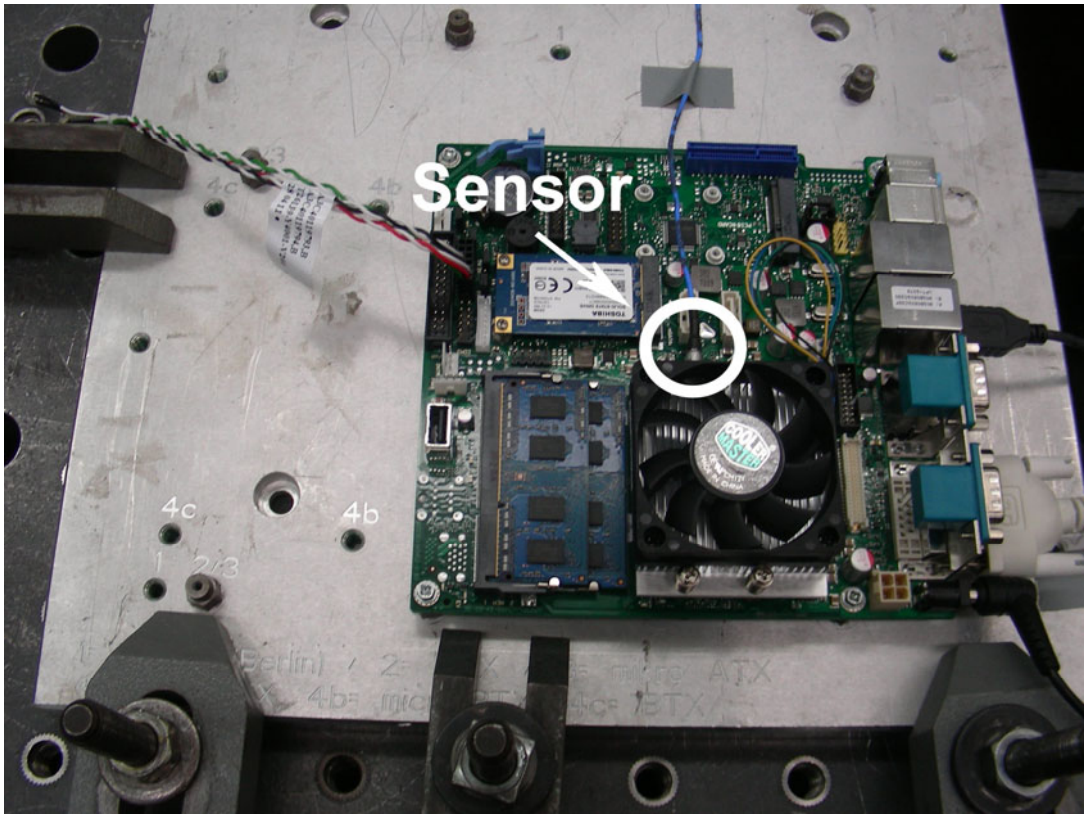
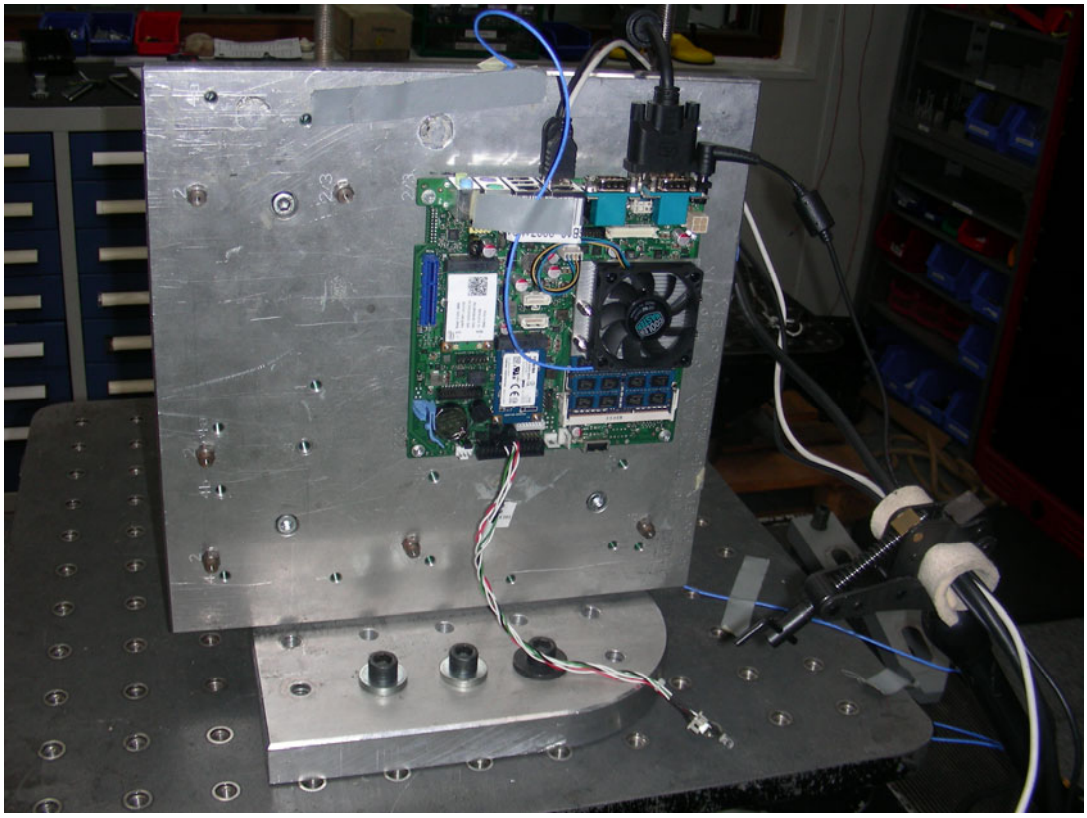


Picture no. 3: Measuring point no. 1 (heatsink)



Picture no. 3: EUT on y-axis