



## TEST REPORT

### Environmental Testing

EN 60068-2-27:2009

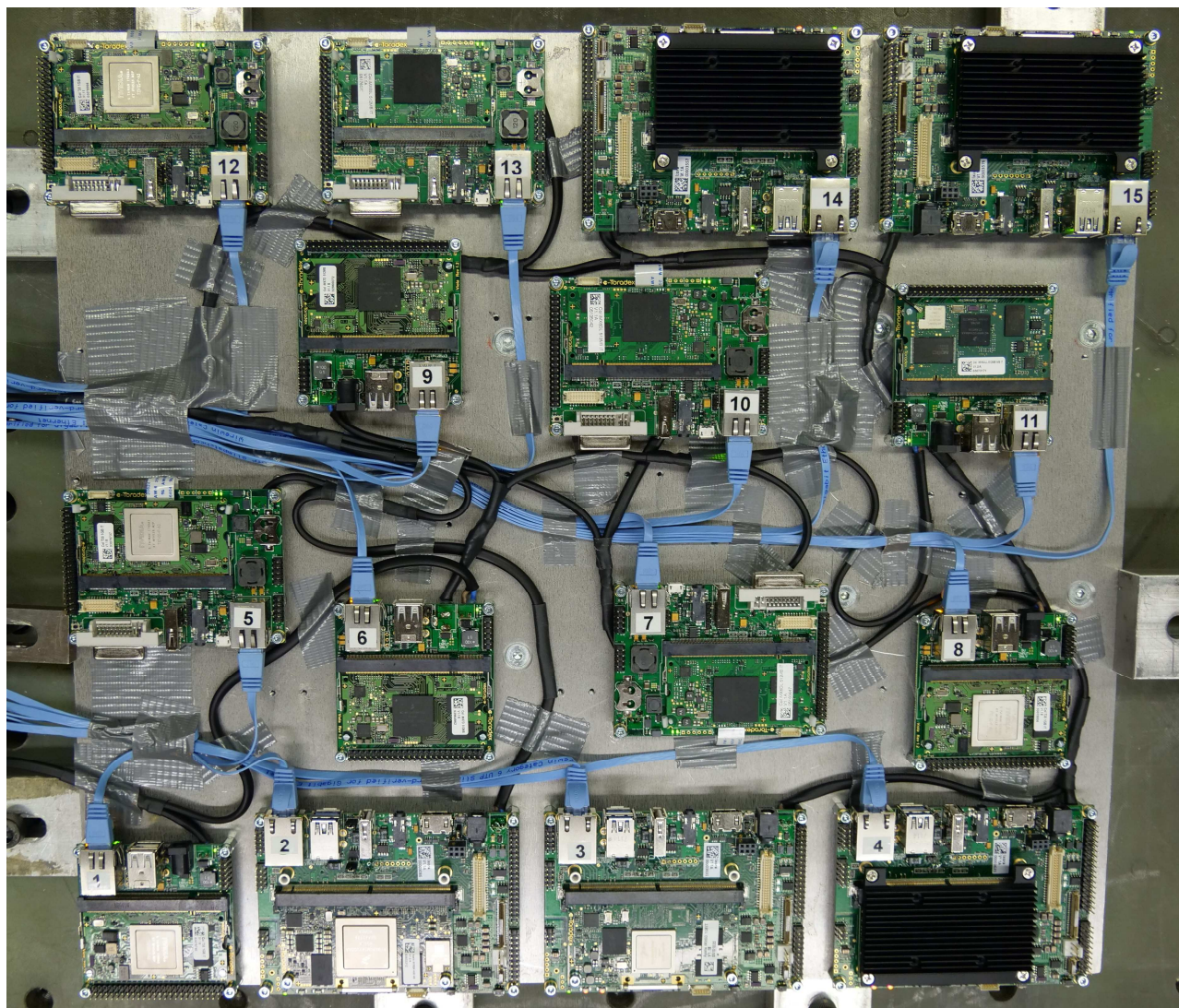
### Test Ea: "mechanical Shock"

<b>Report reference no:</b>	U2243-24a-18	
<b>Simulation carried out by:</b>	B. Belegu	
<b>Approved by management:</b>	D. Vonarburg, Technical Manager	
<b>Date of issue:</b>	28 May 2018	
<b>Number of pages:</b>	5 pages	
<b>Testing laboratory:</b>	<b>QUINEL AG</b>	 STS 0037
<b>Address:</b>	Elsihof 3, CH-6035 Perlen	
<b>Testing location:</b>	QUINEL Bern	
<b>Applicant's name:</b>	<b>Toradex AG, Mr Diego Petracca</b>	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">S T S</div> <div>             Schweizerischer Prüfstellendienst              Service Suisse d'essai              Servizio di prova in Svizzera              Swiss testing service           </div> </div>
<b>Address:</b>	Altsagenstrasse 5, CH-6048 Horw	
<b>Manufacturer:</b>	<b>Toradex AG</b>	
<b>Address:</b>	Altsagenstrasse 5, CH-6048 Horw	
<b>Test Report Form originator:</b>	QUINEL (Copyright reserved to QUINEL)	
<b>Test specimen description:</b>	Computer Modules and Carrier Boards	
<b>Trademark:</b>	Toradex AG	
<b>Model and/or type reference:</b>	Apalis TK1 2GB mounted on Ixora with the Apalis Heatsink Colibri T30 1GB IT mounted on Viola Plus with screws Colibri T30 1GB IT mounted on Iris with Colibri Fasteners Colibri iMX6ULL 512MB WB IT mounted on Viola Plus with screws Colibri iMX6DL 512MB IT mounted on Iris with no additional fastening Colibri iMX6DL 512MB IT mounted on Iris with Colibri Fasteners Colibri iMX7D 512MB mounted on Viola Plus with screws Apalis iMX6Q 1GB mounted on Ixora with the Apalis Heatsink Apalis iMX6D 1GB IT mounted on Ixora with screws Apalis iMX8QM 4GB WB mounted on Ixora with screws	
<b>Rating:</b>	12V/5VDC	
<b>Number of tested specimens:</b>	15 specimens	
<b>Date of receipt of the test specimen(s):</b>	16 May 2018	

<b>Test specification:</b>	
Standards:	EN 60068-2-27:2009
Test purpose:	Type testing for Swiss and EU legal requirements
Procedure deviation:	none
Pulse shape and tolerances:	half sine
Number and direction of shocks:	200 shocks in each direction of the 3 mutually perpendicular axes (total 1200 shocks)
Severity: peak acceleration and duration of nominal pulse:	150ms <sup>-2</sup> (15g) 11ms
Specimen is operating:	yes
Specimen:	unpacked
Pre-conditioning procedure:	Temperature stabilised at ambient temperature during 2h
Recovery procedure: (before the final measurements)	none
<b>Test procedure and measurements:</b>	
Date of testing:	16-24 May 2018
Details of mounting or supports: (see also IEC 60068-2-47)	see photographs
Initial test: - visual inspection: - mechanical and electrical measurements:	<b>Passed</b>  All the DUTs have been tested by the customer with the default functional testing (FCT): <b>no issues detected.</b>
Intermediate measurements:	While the DUTs are exposed to vibrations the devices execute software to detect discontinuities in the edge connector or failures on the module and carrier boards.  This is achieved by detecting GPIOs interrupts, network issues, UART communication loopback problems.
Final test: - visual inspection: - comparison initial/final tests:	<b>Passed</b>  Several investigations have been carried by the customer to identify effects of the test on the module - carrier board interface: <b>no issues detected.</b>  Computer modules have been tested with the default functional testing (FCT): <b>no issues detected.</b>
<b>Relevant specifications to be met during/after the test (acceptance criteria):</b>	
The module – carrier board interface is not affected at all from the vibration test. The computer modules have no damage and worked correctly during and after the test (verified by visual inspection and default functional testing FCT).	
<b>Conclusion:</b>	<b>Test Passed</b>

**Used test equipment:**

Test equipment	Manufacturer / Type	QUINEL Inventory No.	Calibration	
			last	next
Vibrator	RMS / SW 8100	903682/00	Oct 16	Oct 18
Acceleration meter	Kistler / 8702B500M1 and 5134	C110844	Sep 16	Sep 18

**Photograph of the tested item:****General Remarks:**

The test results presented in this test report relate only to the tested objects.  
This test report shall not be reproduced except in full.  
We returned the test item together with the test report to the applicant.

**Photographs:**

**Shock axes:**

Axis 1



Axis 2

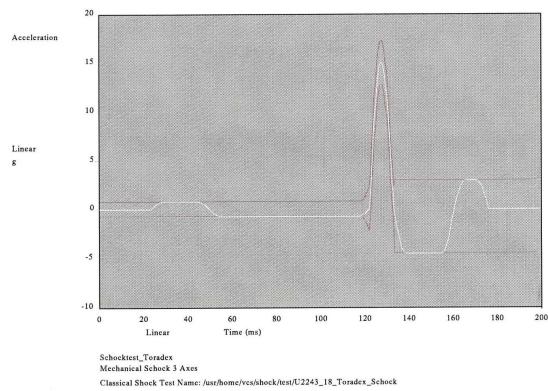


Axis 3



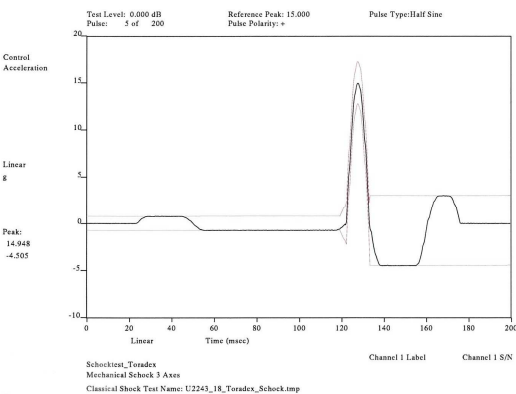
Shock diagrams:

Reference



Shock diagrams:

Test positive



Test negative

