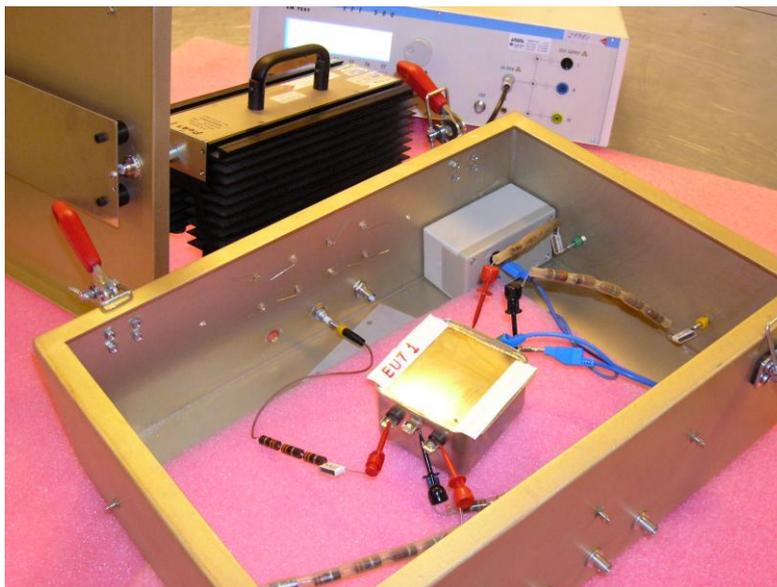


Advanced HALT

Investigation of non thermo-mechanical exposures

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SPM

Society for Reliability and Environmental Testing

SPM is an independent organisation consisting of about 75 company members in Scandinavia.

SPM initiates and finances unprejudiced investigations of common interest for its members – mainly in the field of reliability and testing of electronic components and materials.

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Table of contents		Page
1.	Abstract	4
2.	Introduction	5
2.1	Purpose of the project.....	5
2.2	Introduction to HALT	5
3.	Test plan	9
3.1	Test specimens	9
3.2	Exposures	9
4.	HALT cases	25
4.1	Hearing aids – sweat	25
4.2	Medical devices - bounce.....	38
4.3	Devices – temperature / humidity / drop.....	45
4.4	Window control systems - EMC.....	53
5.	General guidelines	77
6.	Conclusion	85
Annex 1	Literature references	
Annex 2	DELTA HALT facilities	
Annex 3	Case study: Sweat stress detailed test data	
Annex 4	Case study: Humidity/temperature/drop stress	

1. Abstract

SPM members have gained extensive data which can serve as basis for an evaluation and implementation of classic HALT i.e. HALT with thermo-mechanical exposures from SPM-169: “When and how is HALT relevant?” [1].

Thermo-mechanical failure mechanisms cover a significant proportion of all failures. However, numerous failure mechanisms exist where thermo-mechanical exposures are not relevant. Thus it is important to extend the exposures beyond the thermo-mechanical exposures in order to take these failure mechanisms into account. Little experimental work has been performed in this field. Most users of HALT have focused on classic HALT in the past.

The purpose of this project is to establish methods to perform HALT with other exposures than thermo-mechanical. The project investigates non thermo-mechanical HALT with exposures like corrosion, humidity, bounce and EMC. Practical methods, relevant and efficient equipment and the ability to stimulate relevant failure mechanisms according to the HALT philosophy have been investigated for each of the exposures. Further, the methods are demonstrated on a number of products made available to DELTA by the companies participating in this project.

These cases include HALT with sweat exposures of hearing aids, HALT with bounce exposures of medical devices, HALT with temperature/humidity/drop exposures of electronic devices, and HALT with EMC exposures of window control systems.

Apart from supplying the products for the cases these companies represented by Poul Hilding Andersson, Oticon A/S, Steffen Hansen and Hans Fhær Larsen, Novo Nordisk A/S, Sven Erik Poulsen and Turi Bach Roslund, Bang & Olufsen A/S and Jens Philipsen, VELUX A/S have been of valuable assistance during this project.