

ACCELERATED LIFE TIME TESTING OF PORTABLE PRODUCTS

Life time prediction in early development

Portable devices are subjected to heavy wear and tear in normal use, especially in industrial and healthcare environments. It is of outmost importance to detect weak designs and early failure parts before they reach our customers.

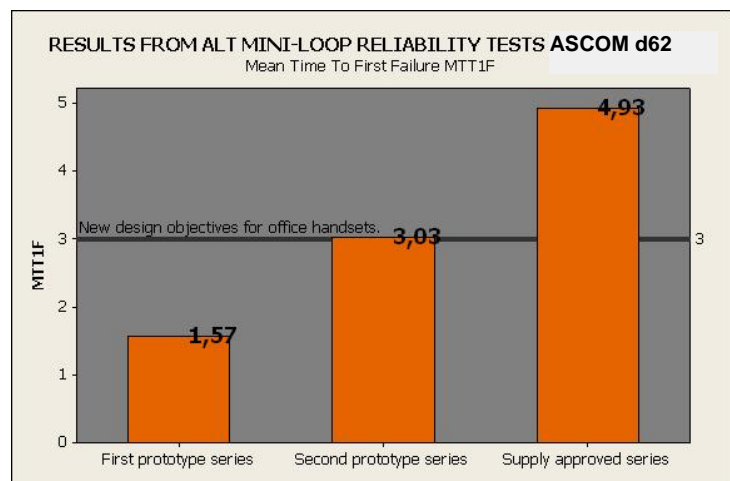
The Mechanical design department in Göteborg has the last years worked extensively with methods that can predict real usage life time predictions. The method is called ALT (Accelerated Life Test) Mini Loop. This methodology was used during the development of our New generation DECT handsets.

The principle with the ALT test series is that we take a large number (16 units) and perform a test series consisting of 8 different stress cases, specially designed to simulate real life time usage, but in an accelerated manner, which in turn are looped 5 times over. By this looping and the large amount of units, we get good statistics over error quantity and when they are found, i.e. a Weibull statistic number we call MTT1F (Mean Time To first Failure) between 1 and 10.

Quality growth during the design phase

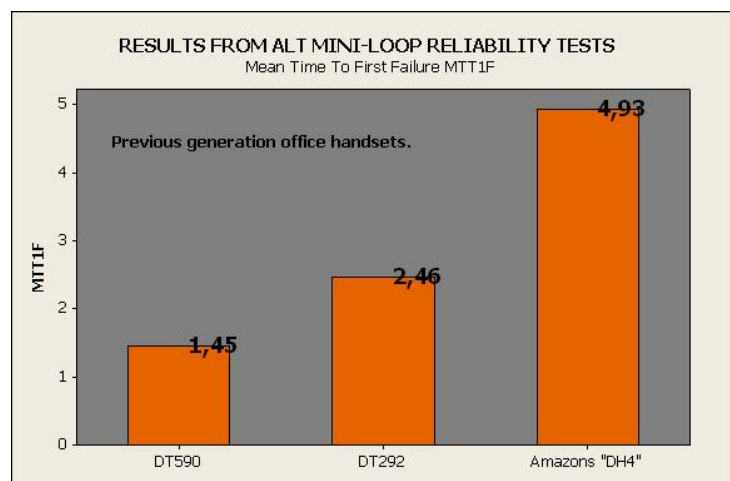
The graph to the right shows the result from the ALT tests on the Ascom d62 handset during development. We were able to detect and rectify weak designs between the different development generations.

The numbers are relative indicators as explained above and do not represent an absolute time. We are aiming to have a MTT1F of >3 for office handsets in new design



Calibration with existing products

We have also tested existing products to find a "calibration" of the method. Both DT590 and DT292 are stable products with a low return rate. What our measurements shows is that d62 will have substantially longer life and lower return rate then our current products.

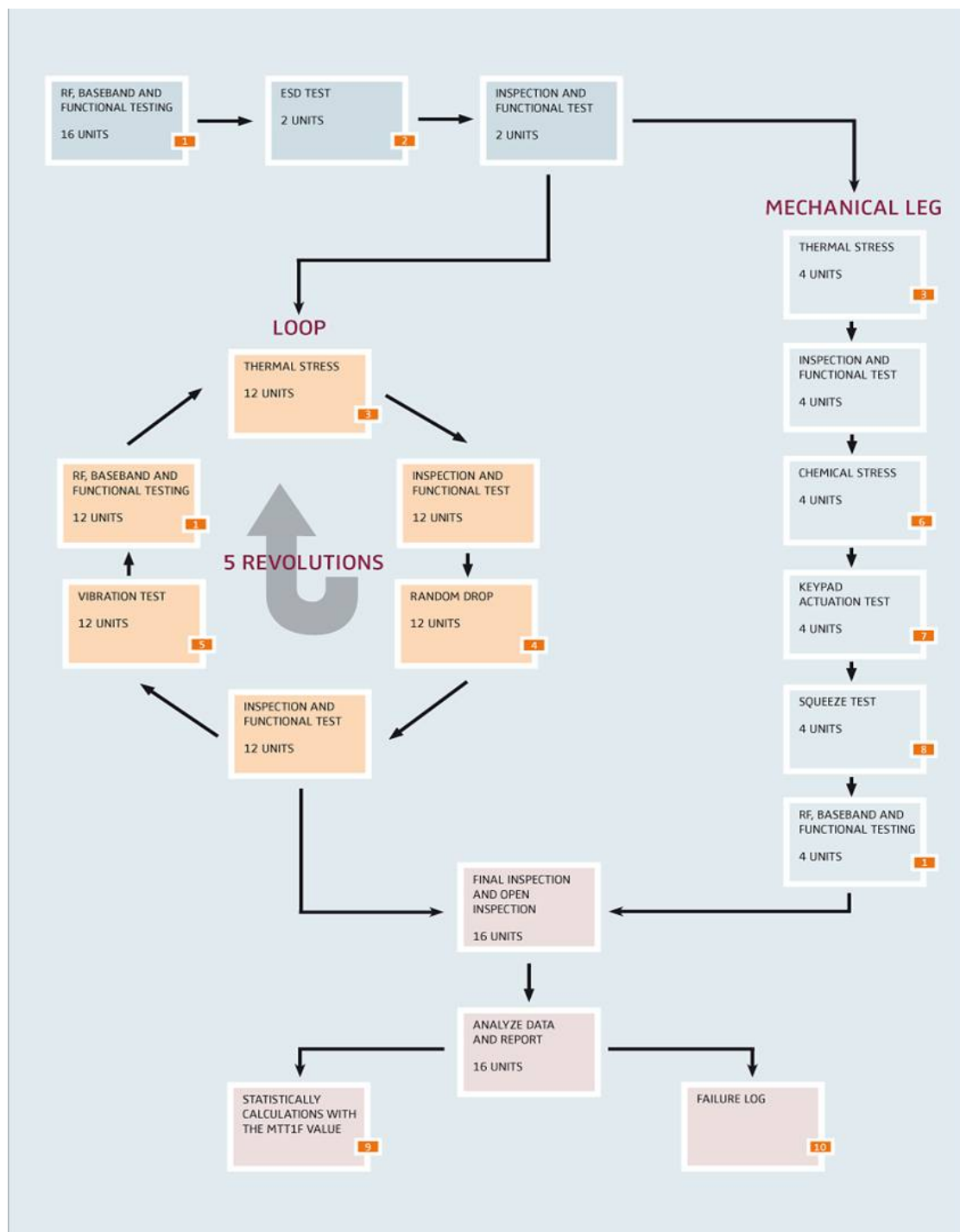


ACCELERATED LIFE TEST (ALT) MINI-LOOP TEST PROCEDURE

16 units are used during the total test. The handsets are divided into two groups; one with 12 units that are going into the “loop” and 4 units that are going through the sequential test. The units that are in the “loop” are inspected after each step, and if OK they are passed on to the next test. When a failure is detected that unit is given a “grade” as a function of how far through the test the failure occurred.

The units in the sequential tests are subjected to increasing levels of stress until a maximum value is reached or the unit fails. Also for these units a “grade” is given as a function of how far through the test and at what level the failure occurred.

All values from the different handsets are then statistically combined and a final grade is calculated.



MECHANICAL LEG – TESTS

ESD TEST

Two units are to be subjected to discharges at +/- 5kV +/- 8kV and +/- 15kV. There will be 10 discharges at each voltage and polarity



RANDOM DROP TEST

- The units are dropped, from 120 cm, one time in all six planes. Totally each unit is dropped 30 times after the completed ALT Mini-Loop Test
- Inspection and Function Test.



VIBRATION TEST

- The units are vibrated for five minutes on all six planes.
- The vibration parameters are, 30Hz and 1,52mm displacement.
- RF testing
- Baseband Testing
- Functional Testing



CHEMICAL STRESS

The units are greased with oleic acid and then rubbed dry.

The oleic acid might cause cracks in plastic, lift or delaminate coatings and paint degradation.

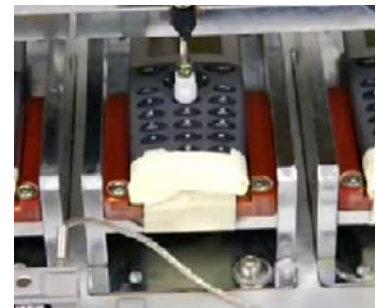
The acid might affect the results in coming tests.



KEYPAD ACTUATION TEST

The units are subjected to 15k cycles of, 13N, key actuations.

Function tests are carried through at 3k, 10k and 15k cycles.



With this method we are in a unique position to predict field issues already in the design phase. Our aim is to come to a next level when it comes to predictable handset design.

The field experience of our new generation will prove how well our new design method is working.