How to test?

- Manual checks
- Automated optical inspection (AOI)
- Automated X-ray inspection (AXI)
- In-circuit testing (ICT, FPT, BST)

Visual inspection; checking the components for presence, position, orientation and solder quality. The X-ray technology is used for non-visible areas.

- Dynamic stress test/ environmental stress screening (ESS)

Operating conditions are tested by applying vibration, temperature cycling, climatic and other environmental simulations. The aim is to identify failures with sporadic or continuous verification of function.

- Safety verification

Verification of leakage current, PE conductor continuity, high-voltage and insulation resistance ensures electrical safety.

- Functional testing

Checks the functions (electrical, optical, acoustic, wireless, etc.) of clusters, assemblies, modules, devices and sub-systems. Digital functions, electrical performance data, evaluation of analogue signal wave-forms, bus simulations, built-in-self-test (BIST) are measured partly in real time and under load. Stimulators and actuators and other general requirements are simulated.

- Programming (ISP) and calibration/adjustment

Calibration and in-system programming as well as verification are conducted as part of the electrical tests.

- In-circuit testing (ICT, FPT, BST)

Checks the components and PCB's electrical properties/parameters via analogue ICT, digital ICT, flying probe, boundary scan test methods, etc.

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The World of Testing

Quality achieved safely

With the right technology straight to your destination

Optimal test depth without redundant tests – Development of a custom device-under-test concept

ZVEI - German Electrical and Electronic Manufacturers’ Association e. V.
PCB and Electronic Systems Division
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Telephone +49 69 6302-437 • Fax: +49 69 6302-438
E-mail: pcb-es@zvei.org • www.zvei.org
By conducting a combined failure mode and effects analysis (FMEA) for
- material
- production and
- function
a targeted test strategy is developed to eliminate or minimize remaining
potential risks.

The ideal test strategy observes
- Requirements of laws and standards
- Coordination of responsibilities
- Product design (DfT – Design-for-Test)
- Quantities and batch sizes
- Desired target quality

Potential consequential costs due to defective products signiﬁcantly exceed the costs of
optimal tests.

An optimized test strategy minimizes the
overall costs.

Why conduct tests?

To achieve the required functionality and reliability!

Our offer:
Take us on board from the start and
lay the foundations for effective testing

Make best use of expertise and knowledge by
involving an EMS partner during product design.
Quality targets are thus achieved efficiently.

- DfT – Design for Testability
  Each testing method has speciﬁc requirements.
  After a joint risk evaluation, we develop the
  ideal test strategy and thus support the imple-
  mentation of wiring and design requirements.

- NPI – New Product Introduction
  NPI is a service package offered by the EMS
  companies aimed at the fast implementation
  of optimum series production for your product
  innovations.
  This also includes the service packages DfM,
  DfC and DfL.

Additional information is provided in the ZVEI
brochure "NPI - The Fast Way to the Series
Product."

Our optimized test strategy:
Core of our common quality plan

The technical and economic feasibility of the
comprehensive test concept with regard to the
quality target determines the responsibilities
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