

SystemAT - Introduction and Applications



SystemAT is a laboratory test system for regression testing of new network software and features prior to network rollout. It also has applications for handset validation and interoperability testing (IOT) as well as network load and capacity testing.

For most operators, testing of new network software or handsets is a manual and labor-intensive process with the disadvantages of high cost, lack of repeatability and limited test coverage. Field trials are expensive and while required for highly site-specific issues cannot guarantee a repeatable environment for diagnosing and validating problems.

SystemAT provides an automated test environment to be used with a test network that allows an operator to automate a large part of the test process *and* extend the depth and repeatability of testing, reducing the amount of field trials required. SystemAT can deliver both operational cost savings on the test process and reduce the technical risks involved in both new software and handset rollout.

The SystemAT architecture is designed for scalability, with the option to incorporate up to 32 commercially available handsets simultaneously in a rack-based design. The SystemAT automates handset voice, data and message generation while simultaneously controlling the RF environment experienced by the handset. The wideband RF design ensures different radio technologies and evolutions can be supported.

The comprehensive logging and data analysis capability combined with the option to support test mobile handsets provides a mobile network operator with the information required to make rapid and highly accurate decisions regarding network performance prior to rollout of new features or software. For example, the SystemAT could be set up to automatically place several thousand mobile-originated or terminated calls, handover each call and then activate a series of data sessions. At the end of the tests, metrics on the network and handset performance can be analyzed.

The integration of multiple handset models within the SystemAT provides operators with a flexible platform to test the features and performance of the network with exactly the same handsets that the customer uses. The SystemAT hardware design enables the rapid integration of new handset models, so that new handset models can also be validated using the SystemAT.

SystemAT is a flexible system with a number of different applications:

- **Network Regression Tests**
Automated test cases can be created to ensure that new software and hardware provided by the network supplier have not regressed in performance.
- **Handset Validation and IOT**
The SystemAT multi-handset hardware supports a range of 2G and 3G commercial handsets. Test cases can then be executed against each handset connected to a real network to test the handset stability and interoperability with the network.
- **Network Functionality and Performance**
Aeroflex supports specific test cases to test network functionality such as handover, stability, radio resource algorithms and KPI's (Key Performance Indicators). Benchmarks can be compared between different networks.
- **Supplier Acceptance Test**
Operators can use the SystemAT for fast acceptance testing of network and handset equipment and software builds. As problems are 100% reproducible, failed test cases can easily be demonstrated to the infrastructure supplier.
- **Load Testing and Network Optimization**
Operators can use the SystemAT to thoroughly test network capacity, throughput and behavior under varying load and traffic conditions. The end-user impact of network configuration changes can be checked.

Benefits of SystemAT

SystemAT reduces technical risks associated with new feature/service/software rollout as well as reducing operational expenditure for testing and field trials. The benefits that the SystemAT brings to an operator are:

- **Automated test environment** – operators can run network tests on a 24 hour / 7 day basis, which will speed up the test program and reduce operational costs and bring the release date for new software or features forward.
- **Test repeatability** – when tests are performed in the field it is difficult to reproduce the same test multiple times which is necessary for de-bugging and optimization. The SystemAT has a high level of RF shielding between handsets and is connected to the base station via a co-axial cable. This means a test can be accurately reproduced which dramatically reduces the time to diagnose and resolve issues.
- **Greater test coverage** – some test cases cannot be run manually which means that potential issues are missed. By using the SystemAT to deliver greater test depth, both technical risks and potential costs are reduced.
- **Commercial mobiles** are used to generate traffic load (not simulated); ensuring results are fully representative of the real customer experience. Handset models can be selected so they represent those most in use on the commercial network.
- **Reduced test preparation time** – test functionality can be specified independently of the handset models in use, so tests do not need changing when new or different handsets are used.
- **Complete handover testing** – Control of the handset's RF environment includes handover between network base stations. This includes different handover types (soft, softer, hard) with varying combinations of carrier frequency, air interface technology and network configuration.
- **Automatic test metric capture** – Metrics are automatically captured according to the test functionality specified. Performance metrics are provided at bearer and application level.

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