

TR Module Testing

Agilent Technologies and COM DEV

Reduce TR module test time without compromising measurement accuracy

Test time and accuracy are the two critical concerns when characterizing transmit receive modules (TR modules). Higher volume, lower cost products still require exhaustive testing. This demands that you reduce your test times, but without compromising the accuracy of the measurements – and at a cost that is affordable.

To put together a modern TR Module test solution you have to address four distinct challenges – the measurement technology to be used, the control of the device under test (DUT), the operating software and the resulting system performance.

- *TR module test solution*
- *For all transmit receive modules*
- *Combines accuracy with fast test times*
- *Uses Agilent PNA-X network analyzer*
- *Manual testing in R&D or automated production testing*
- *Comprehensive pulsed and non-pulsed measurements*
- *Supports multiple DUT testing*
- *Automated test and calibration with CodeOne™ software*

The COM DEV TRM-X is an integrated TR module test system that addresses these challenges for you by providing the best technology to give you the optimum combination of speed and accuracy.

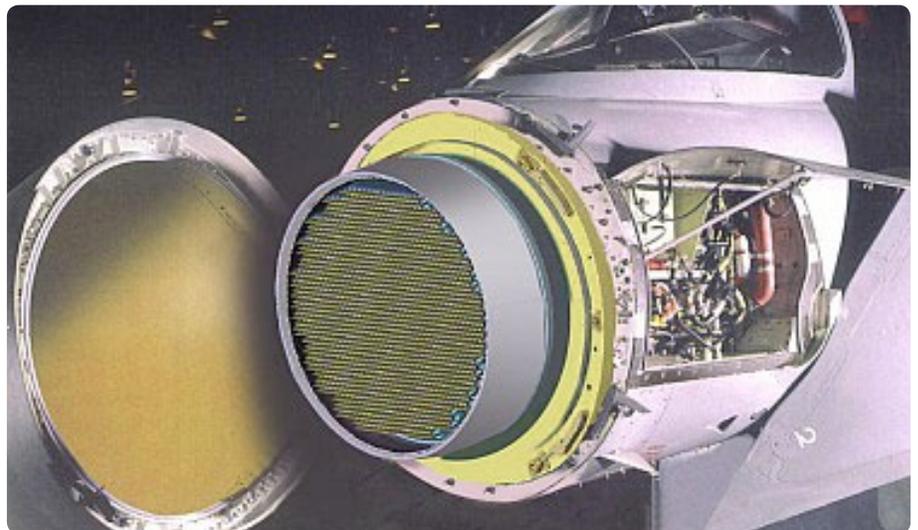
The Agilent PNA-X network analyzer is the measurement instrument at the heart of the system. The PNA-X is the fastest and most accurate network analyzer currently available. The Pulse Measurement Controller (PMC) in the TRM-X controls all aspects of the DUT interface and is fully integrated with the PNA-X in order to optimize the measurement speed. COM DEV's CodeOne software controls all aspects of the system including the DUT, the calibration and the measurements.

The integration of the PNA-X, the PMC and CodeOne results in impressive system performance. When compared to competitive systems the TRM-X is up to 40% faster than non-Agilent systems.

Uptime and Support

For high volume manufacturers, system uptime is critical. The best performance can only be accessed when the system is available for use. As an integrated system, the COM DEV TRM-X TR module test system is designed for reliability and maintainability. The system integration and TR module testing experience of Agilent and COM DEV, together with their extensive support networks ensure that your system is available when you need it.

By addressing the TR module testing challenges directly, the TRM-X allows you to reduce your test time without compromising your measurement accuracy.



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TR Module Testing

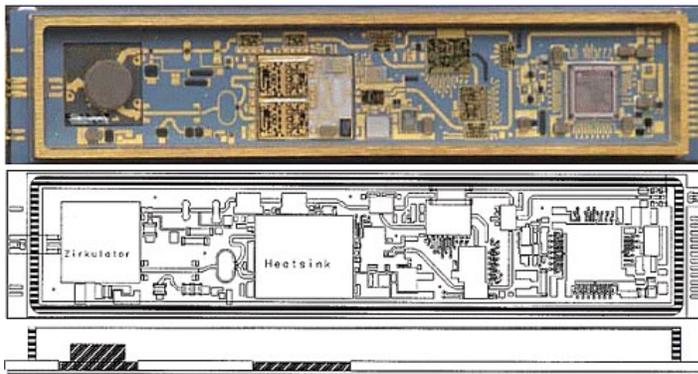
Measurement Technology

The Agilent PNA-X sits at the heart of the TRM-X TR module test system. Compared to conventional microwave vector analyzers the PNA-X offers breakthrough speed, accuracy, performance and multi-function capabilities.

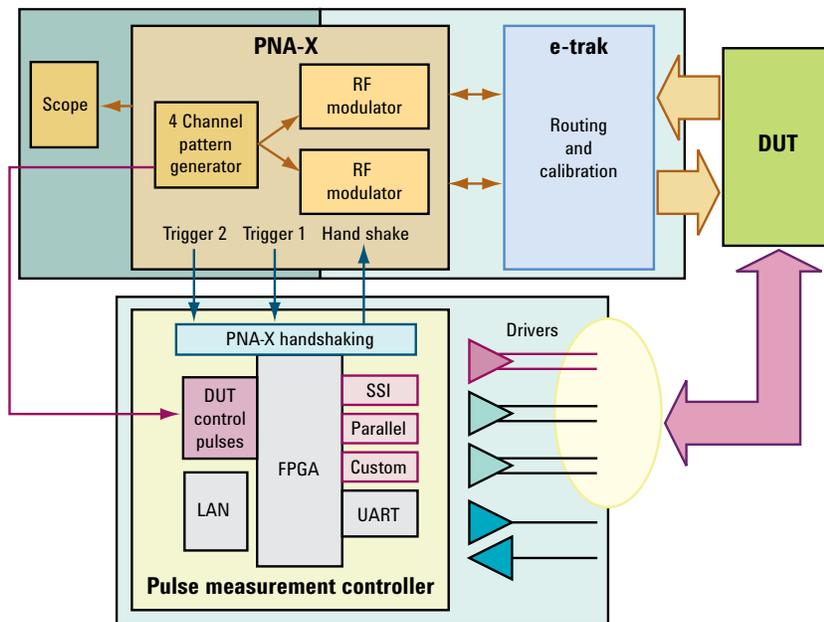
The PNA-X is a measurement system optimized for single connection multiple measurements. Its internal modulators and pulse generators allow fast, simplified pulsed measurements with pulse profiles up to 30 times faster than using external pulse generators.

Its multi-function capabilities, such as internal noise figure measurements, make the PNA-X an excellent platform for a test system such as the TRM-X. With the PNA-X the equipment count in the system is reduced by up to 40% when compared to legacy systems.

The integration of the PNA-X in the TRM-X TR module tester provides high measurement accuracy, reduced system complexity, fast measurement speeds and excellent dynamic range.



Typical transmit/receive radar module



DUT Control

The Pulse Measurement Controller (PMC) is used to control the DUT interface in the TRM-X TR module test system. It is an advanced controller with features that include a programmable digital pattern generator, flexible timing and the ability to support multiple DUT's. The PMC module, based on FPGA technology, is flexible and can be easily configured to suit a customer's specific needs. Communications with the PMC use SCPI over LAN controlled via the system API. The PMC co-ordinates the advanced gated pulse measurements of the PNA-X with real-time DUT control in order to optimize measurement speed.

Pulse Measurement Controller

- Synchronizes PNA-X to DUT for fast and accurate measurements
- Provides timing and measurement pulses to DUT

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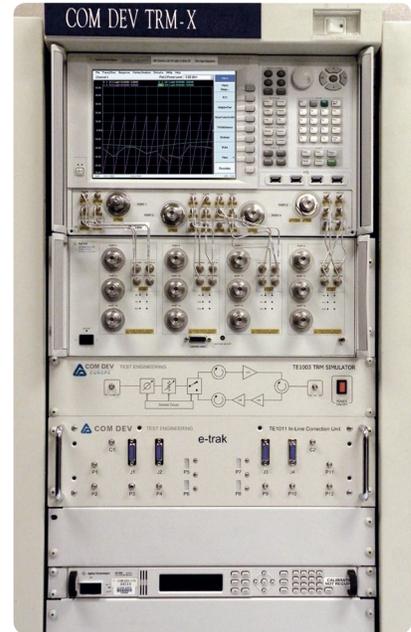
Software

CodeOne is a software platform that is used to control all aspects of the TRM-X TR module test system. The software is based on industry standard tools and languages and is fully configurable and stable. COM DEV's software is designed and built for high reliability testing and for volume production of RF products.

CodeOne can be used to automate all of the major aspects of a test campaign including: the setup and definition of test system paths; calibration; measurement and data storage; automated data analysis and comparison to specification limits; confirmation of results using

interactive plotting and flexible data superposition; fully automated production of test result documentation; and the export of data to the most commonly used formats.

The CodeOne software can be configured as a standalone or a multi-user solution. A standalone solution is very fast to deploy and does not require network access. A multi-user solution is achieved through the use of an existing network and shared disk area. In this mode, data can be collected on multiple stations and stored in a common location. Data can then be analyzed and viewed on any station with the CodeOne client.



System Performance

The TRM-X TR module test system allows fast, accurate pulsed and non-pulsed measurements such as CW, pulsed, noise figure and inter-modulation, all completed within minutes.

The system can be used for manual testing in R&D and automated testing in high volume manufacturing. In manufacturing the TRM-X TR module test system can support multiple DUT testing by the inclusion of a port extender and optional e-trak™ sub-system. The port extender

provides the best possible accuracy for multi-DUT testing while e-trak monitors and corrects errors introduced by switching or environmental effects. Together they optimize the throughput of the system and eliminate production bottlenecks caused by existing pulse measurement systems.

The COM DEV TRM-X TR module test system with the Agilent PNA-X provides the fastest test times with no compromise of measurement accuracy.



e-trak™ In-line tracking module

TR Module Testing

System Components

The typical TRM Test system is composed of Agilent COTS equipment, and COM DEV software and services. A typical configuration is shown below:

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N5242A	PNA-X vector analyzer, 4-Port
E4440A	PSA signal analyzer
346C	noise source
E8257D	PSG signal generator
U3022AE11	10-Port PNA extender
N6700B	low profile MPS mainframe
N4691B	electronic calibration module (ECal)
N1912A	P-Series channel power meter
N1912A	P-Series channel power meter

COM DEV

System Requirement Definition
e-trak Calibration and Tracking Sub System
System Design
System Integration
Standard CodeOne Software
System Test and Certification
Custom Software
Installation
Special Test Equipment including DUT control
Commissioning
Fixturing
Operator/Test Engineer Training
Thermal Chamber
Custom System Support
Hot/Cold Plate

ComDev and Agilent Technologies can work with you to define a custom system to meet your unique requirements. Contact your local Agilent Technologies sales office or your Field Engineer.

To learn how this solution can address your specific needs please contact Agilent's solutions partner, COM DEV Test Solutions

www.agilent.com/find/comdev



Agilent Solutions Partner Program

Agilent and its Solutions Partners work together to help customers meet their unique challenges, in design, manufacturing, installation or support. To learn more about the program, our partners and solutions go to

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COM DEV Test Solutions is a global provider of RF test solutions with 30 years of test experience. The Group has developed a unique expertise in calibration techniques, multiport microwave test systems and modular flexible test software. The Solutions are well suited for applications with stringent requirements such as high frequencies, a large number of RF ports, difficult environmental conditions, or applications requiring stable and accurate RF calibrations.

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