

# Microwave Relay Measurements made Easy with PXI

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## The Test problem

The goal was to double the test capacity of more than 20 test benches which measured the performance of Radiall microwave switches. Each microwave switch required comprehensive testing of contact characteristics, within a test chamber, under different climatic conditions, before delivery to the customer. The upgraded



test benches needed to improve their capacity, speed of test and flexibility. The switches needed to be operated in a climatic chamber over an extended period while undergoing thermal cycling. Each test bench needed to be able to manage a variety of different microwave switches during the same test run.

## Participating companies.

Radiall ([www.radiall.com](http://www.radiall.com)), a French manufacturer of microwave relays and the end user of the system, conducted all the evaluation work for various solutions proposed by vendors.

In the end, Mesulog ([www.mesulog.fr](http://www.mesulog.fr)), a systems integrator, and Pickering Interfaces collaborated together to provide an integrated PXI solution that could be evaluated and compared to alternative competing solutions.

## Test Approach

Each test bench was proposed to be based on a PXI solution that included a bar code scanner to identify the part under test, a PXI DMM that performed a four-terminal resistance measurement of the contact resistance, Pickering Interfaces PXI matrix to route the DMM to measure the DUT's contact characteristics, and a software environment based on the use of NI LabVIEW® and Test Stand®.

A significant challenge was the choice of a suitable switching system to allow the DMM to perform a four-terminal resistance measurement on the microwave devices in the chamber. The four-terminal measurement was required to allow the DMM to measure the resistance independently of the resistance in the connecting wires and switches. The DMM had to handle multiple devices, each with multiple contacts, so the switching system had to be flexible. It also needed a long service life since the test benches could be in continuous use over many years of operation.

## **Solving the switching problem**

There were no obviously superior choices for the switching system available – speed, reliability, and accuracy were the key criteria. Mesulog evaluated a number of approaches available, all of which had compromises. Finally, Pickering Interfaces and Mesulog collaborated together to define a new approach to the problem based on a model 40-500 64x4 FET-Based Multiplexer. The use of FETs provided virtually unlimited life while the use of four-terminal measurement offset any path resistance inherent in FET Switches.

## **A Positive Assessment and Successful Collaboration**

The use of standard products available in the market on both the software and hardware level enabled the integrator to provide a flexible and user-friendly Microwave Relay tester. The PXI architecture through the FET switches allowed an unequalled speed execution compared to other relay technologies while having an unlimited life cycle.

PXI was a logical choice because of product availability, the speed of the architecture, small footprint, and cost effective solutions.

The bottom line is that the twenty benches are migrating towards this new architecture.

In addition, this same architecture will be used as a core for the recasting of another type of bench used by the RADIALL Test department.

The collaboration between Mesulog and Pickering Interfaces, in close cooperation with Radiall, assured a successful implementation of PXI on the test floor. The use of PXI made the integration easy and fast and a good experience for the end customer.