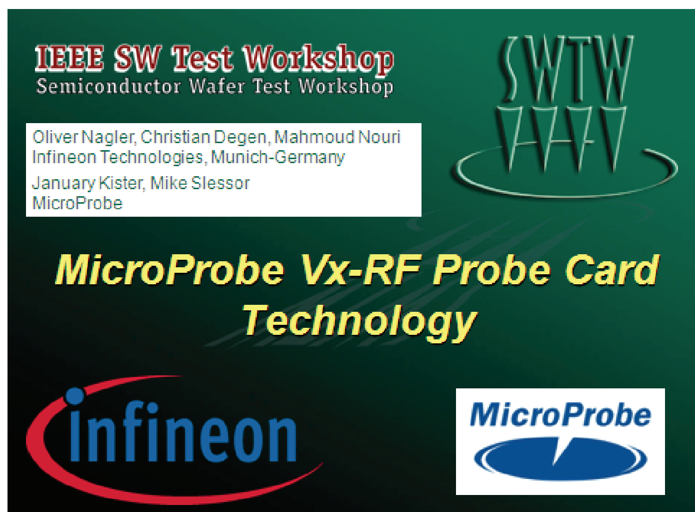
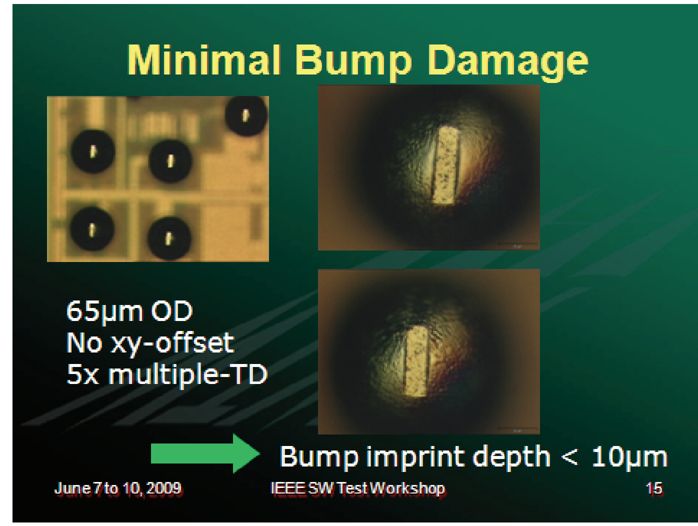
IEEE SWTW 2009 Paper Overview – Infineon/MicroProbe Vx-RF





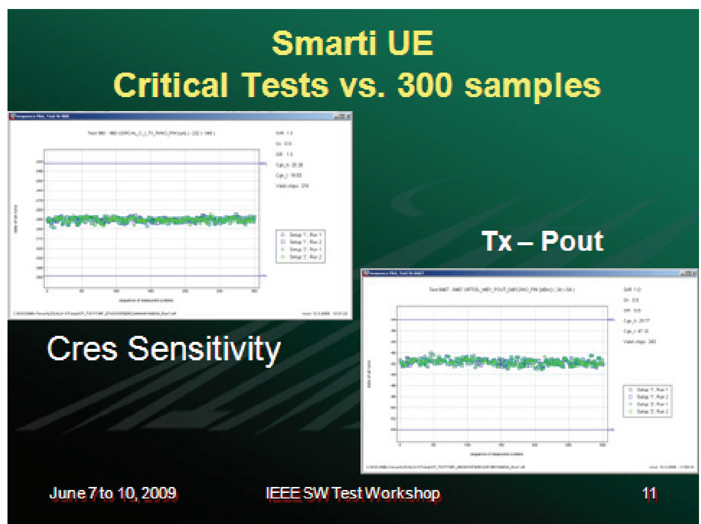
At the recent Southwest Test Workshop, Infineon Technologies and MicroProbe co-presented results from an evaluation and qualification of MicroProbe's new Vx-RF-80 probe card. This card, which utilizes MicroProbe's proprietary MEMs-enabled technology platform, enables robust production wafer test of bumped and wire-bonded RFIC devices.

For the qualification project, Infineon selected their Smarti-UE single-chip CMOS transceiver, a chip-scale-packaged (CSP) die with ~80 lead-free bumps on a 200µm pitch grid-array layout. The Vx-RF-80 card is designed to address pitches as tight as 80µm with a roadmap to 40µm. The qualification project tested electrical and mechanical performance, while validating the Vx-RF-80's tolerance to particle contamination and bump-to-bump non-uniformity in comparison to existing "membrane" probe-card technologies.

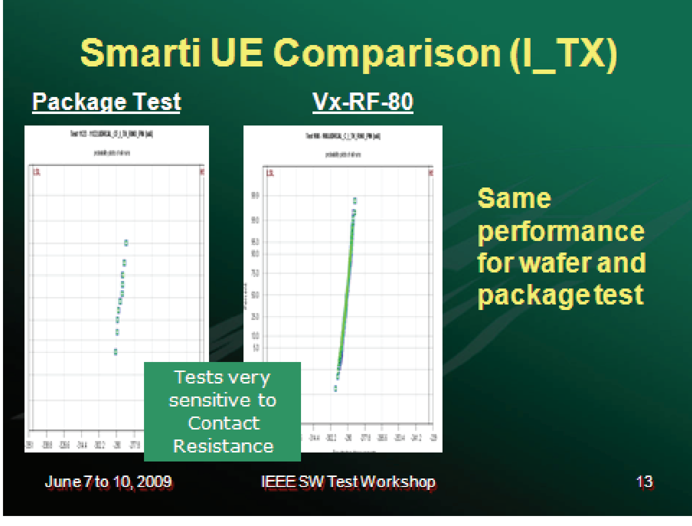
Initial testing focused on mechanical performance, with a particular emphasis on probe/bump interaction and damage. Since elements of the Smarti family are marketed as known-good-die (KGD) products (where wafer test is effectively final test), minimizing probe-induced bump damage is critical. The combination of mechanical stability, lithographically-defined tip structure, and engineered scrub dynamics featured in the Vx-RF-80 results in bump deformation in a well-defined spatial region less than 10µm deep, even after five repeated touchdowns.

Standard cleaning methods and materials were employed throughout the qualification process. An online (prober-based) clean using ITS 1µm lapping film every 250-750 wafer touchdowns was determined to be the optimum balance between card lifetime and electrical/yield performance.

Electrical testing validated performance and stability of individual Vx-RF-80 cards, as well as card-to-card consistency. Two critical tests that expose instabilities in contact resistance and bandwidth demonstrated the required consistency both within cards and between different cards.



Finally, excellent agreement between wafer and package test results was demonstrated with an at-frequency (5GHz) test known to be sensitive to contact-resistance performance. This result validates the accuracy and stability of the card, as well as its suitability for KGD applications.



In summary, the MicroProbe Vx-RF-80 probe card provides a robust cost-effective solution to the challenges of production RF wafer test.