

**Monday 3/10/14 2:30pm**

If one was good, two must be better! Poster Sessions that is! We had so many qualified submissions this year, we divided them in to two Poster sessions offering a variety of relevant topics to augment what you'll learn sitting in the Podium sessions.

Poster Sessions are a great way to network through interaction with the poster presenters and other curious bystanders, multitask during a break and stretch your legs after a long session.

## **One Piece Stamped and Formed Probe Pin**

Ichiro Fujishiro—Yamaichi Electronics



This Poster

## **Correlation and Measuring Techniques for +/-5% Impedance**

Tom Bresnan—R&D Altanova

## **Compliance Grounding -The Mechanical Importance of Grounding**

Shamal Mundiyyath—JF Microtechnology Sdn Bhd

### **COPYRIGHT NOTICE**

The paper(s) in this publication comprise the Proceedings of the 2014 BiTS Workshop. The content reflects the opinion of the authors and their respective companies. They are reproduced here as they were presented at the 2014 BiTS Workshop. This version of the papers may differ from the version that was distributed in hardcopy & softcopy form at the 2014 BiTS Workshop. The inclusion of the papers in this publication does not constitute an endorsement by BiTS Workshop, LLC or the workshop's sponsors.

There is NO copyright protection claimed on the presentation content by BiTS Workshop, LLC. (Occasionally a Tutorial and/or TechTalk may be copyrighted by the author). However, each presentation is the work of the authors and their respective companies: as such, it is strongly encouraged that any use reflect proper acknowledgement to the appropriate source. Any questions regarding the use of any materials presented should be directed to the author(s) or their companies.

The BiTS logo and 'Burn-in & Test Strategies Workshop' are trademarks of BiTS Workshop, LLC. All rights reserved.



## Correlation and Measuring Techniques for +/-5% Impedance

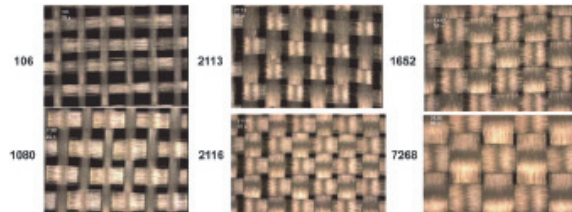
Tom Bresnan  
 R&D Altanova

### Introduction

- Motivation
  - Customer Demand for Tighter Impedance Control to 5% and Less
  - Industry Process Challenges
  - Some Theory
  - Fabricator & Customer Correlation

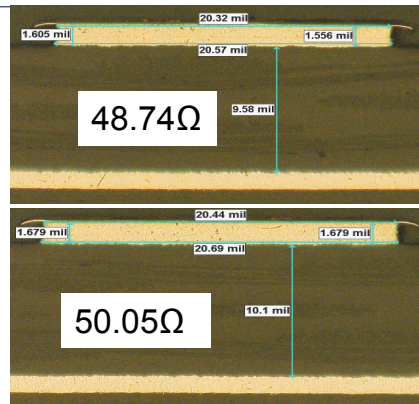
### Industry Challenges

- PWB Process Variations
- Laminate Constructions
- $\epsilon_r$  and Df Variations
- Relative Permittivity
- Repeatability



### Industry Challenges

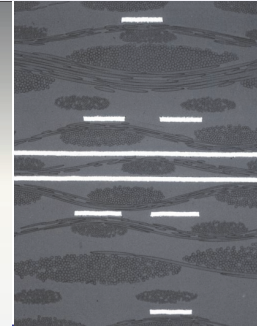
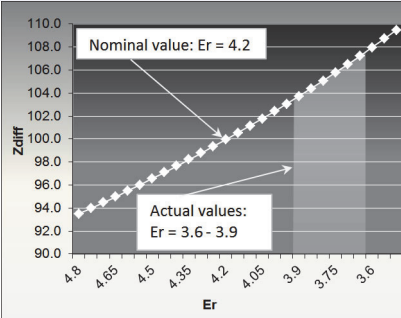
- Etching Tolerance
- Material Thickness Variation
- Surface Plating Variations
- Repeatability



## Challenges

### Hidden Challenges

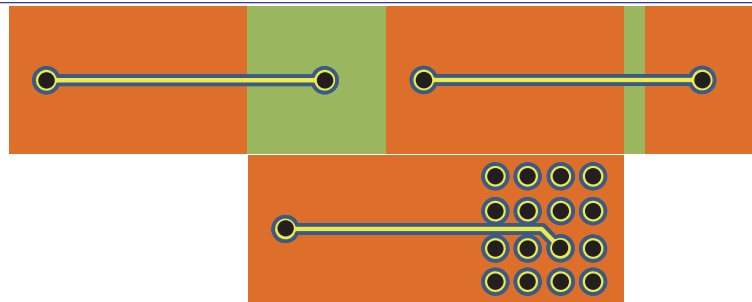
- Electrical
- Dielectric Constant or
- $\epsilon_r$  (or Relative Permittivity)
- Effective Permittivity



### Design

#### Challenges:

- Pull Back
- Split Plane
- Via Field



### Responses to Industry Challenges:

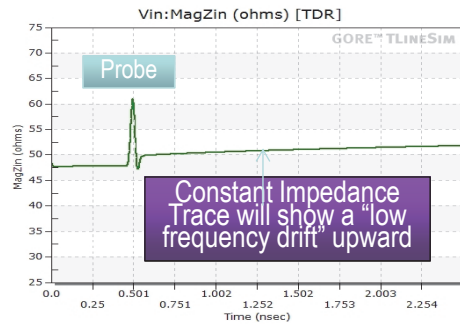
- Limited Laminate Supply & Construction
- Surface Plating Enhanced by Reverse Pulse Plating (or RPP)
- Materials Sorting and Segregation
- Etch Chemistry Choice and Control – Cupric Chloride ( $\text{CuCl}_2$ )



## Theory and Conclusion

### Theory

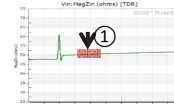
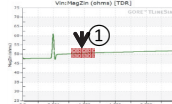
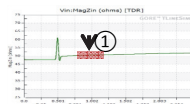
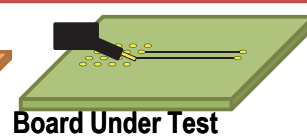
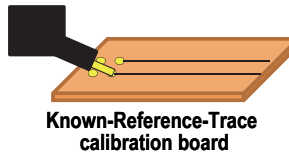
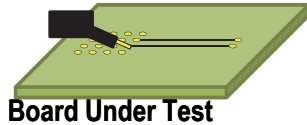
- Drift
- Discontinuities at the Launch Site
- Probe Interface
- Reflections
- False Readings



Select a stable spot on the TDR plot

Calibrate to 50 ohms

Measure Board Under Test



### Conclusion:

- Specified & Measured Materials
- Strict Line Width Control
- Calibration Plans-Fabricator & Cust.
- Qualified Operators
- Qualified Tools
  - Gage R&R

