2016 IEEE International Test Conference
Nov. 15 (Tue) 16:30-18:00 Panel 3

Test Cost Reduction – Is there more to cut ?

Organizer & Moderator
Haruo Kobayashi (Professor, Gunma Univ)

Panelists

Wim Dobbelaere Wim

Director of Test Development, On Semi

Robert Van Rijsinge, Robert

Director of Test Development, NXP

Peter Sarson Peter

Test Development Manager, AMS

Bob Bartlett Bob

Director of Test Technology, Advantest

Rob Knoth Rob

Product Management Director (Test Products) , Cadence

Discussants

Kazumi Hatayama (Visiting Professor, Gunma University)

Hatayama-san

Hans Martin von Staudt (Director Design for Test, Dialog Semiconductor)

Hans

Self-Introduction of Organizer and Moderator

Name: Haruo KOBAYSHI

First name family name

Please call me Kobayashi-san

My research background :
analog / mixed-signal circuit design & testing,
signal processing algorithms

Professor,
Division of Electronics & Informatics
Gunma University

Panel Explanation

- LSI testing is not just technology,

but also it is a part of company management strategies.

- Some companies may use low cost ATE
- Others may use high-end mixed-signal ATEs

as well as their associated services & know how.

- It also depends on applications of the DUT;

for automotive application ICs, reliability and safety are very important and sufficient testing is required.

- Even in automotive application cases, test cost reduction is very important as well as test quality.

In this panel, several possible LSI testing methods in terms of test cost reduction will be discussed.

Q1. Please explain your position.

If you believe that there is more cost to cut,
answer where to cut and
why they believe today's technologies support such cost cutting .

If you believe that there is no more cost to cut,
explain why that is the case.

Q2. Please introduce
your technical and business background

Q3. What is your definition of test cost.

Q4. What is your definition of test quality.

Q5. What techniques do you use
for test cost reduction ?

Q6. What do you expect to BIST/BOST/DFT for
LSI test cost reduction and
test quality improvement ?

Q6. Explain test cost balance
between analog part and digital part
for mixed-signal SoC.

Q7. Please explain your position
regarding LSI test cost reduction

Q8.

To: Semiconductor companies

Please explain your company's management strategy regarding LSI testing.

Also tell us who is (and/or should be) responsible for the test strategy: test engineers, DFT engineers, or IP engineers ?

To: ATE vendor & EDA vendor

How do you support them ?

Q9. Is only test cost reduction enough ?

Q10. What do you think about
cost/performance for LSI testing ?

Q11. What is your definition of
FOM (Figure of Merit) for LSI test technology ?

Q12. What do you think about balance
between test cost and quality ?

Q13. What are the expected innovation and challenge for test cost reduction in the future ?

Q14. How do your LSI testing work make people (users of final products, your customers, your company, yourself) happy ?

Q15. What is your overall philosophy related to LSI testing ?

2016 IEEE International Test Conference
Nov. 15 (Tue) 16:30-18:00 Panel 3

Test Cost Reduction – Is there more to cut ?

Panelists Introduction

Organizer & Moderator
Haruo Kobayashi (Professor, Gunma Univ)

Panelists

① Wim Dobbelaere Wim

Director of Test Development, On Semi

② Robert Van Rijsinge, Robert

Director of Test Development, NXP

③ Peter Sarson Peter

Test Development Manager, AMS

④ Bob Bartlett Bob

Director of Test Technology, Advantest

⑥ Rob Knoth Rob

Product Management Director (Test Products) , Cadence

① Wim Dobbelaere

Director of Test & Product Engineering of
Automotive Mixed Signal Business Group
ON Semiconductor.

- Ph. D. degree in Microelectronics from University of Leuven, Belgium (1992)
- M.S.E.E from the University of Illinois at Urbana-Champaign (1988)
- M.S.E.E from the University of Leuven, Belgium (1987)
- Gaduate fellow of the Belgian-American Educational Foundation (BAEF)

- Author/co-author of 30 scientific publications
  in the areas of mixed signal test, III-V semiconductor materials,
  infrared detectors and infrared light emitting diodes.

② Robert Van Rijsinge

Director of Test Development, NXP

28 years in Semiconductor testing and
having a broad experience in test
– from managing test operations
to developing DfT and test strategies

③ Peter Sarson

Test Development Manager, ams AG

- Semiconductor test professional
  with 16 years of experience developing test solutions.

- Business background is primarily
  in applications engineering business
  for the ATE market i.e. selling test services

④ Bob Bartlett

Background in computer science and device physics

Bob has been involved in all aspects of ATE and SLT testing of semiconductor RF, SERDES, mixed signal, memory and MPU devices.

He has worked in engineering roles at various ATE and semiconductor companies.

Currently the Director of Test Technology at Advantest Corporation focused on ATE platform deployment
for advanced Analog, SERDES and mmWave test applications.

⑤ Rob Knoth

Director of Product Management,
Cadence Design System in digital and signoff group.

Responsible for test technology, mixed-signal, automotive markets.

He was on Intel Custom Foundry's strategy and planning team, and
Intel's layout convergence lead for its Xeon Phi products.

He handled a variety of roles from applications engineering
to technical marketing at Magma Design Automation,.

One of the lead ASIC designers at Tektronix ,
responsible for physical implementation of test & measurement IC's.

B.S. degree in electrical engineering from Purdue.

2016 IEEE International Test Conference
Nov. 15 (Tue) 16:30-18:00 Panel 3

Test Cost Reduction – Is there more to cut ?

Summary of Panel

- Cost can be optimized, rather than cut
- Ideally "Cost of Test = $0"
- Key is importance of cost & quality in the market
- Better and cheaper !
- A lot of room to improve test cost and quality,
  not only for analog, even for digital parts.
- Automotive : low quality = out of business
- Automotive future = analog defect-oriented test,
  analog fault simulations using EDA tools
- Optimize the whole system – function, safety,
  reliability, security, … See big picture.
- Analog is the key battle!
- A device might be the best in the world
  but if you cannot test it, it is worthless

2016 IEEE International Test Conference
Nov. 15 (Tue) 16:30-18:00 Panel 3

Test Cost Reduction
– Is there more to cut ?

Great Men's Sayings

Is only test cost reduction enough ?

Let’s consider what the business book says:

THREE RULES

HOW EXCEPTIONAL COMPANIES THINK

BY MICHAEL E. RAYNOR AND MUMTAZ AHMED

How do some companies achieve exceptional performance over the long term?

Rule No. 1: Better before cheaper:

They rarely compete on price.

No. 2: Revenue before cost:

They drive profits through price and volume, not thrift.

No. 3: There are no other rules.

What do you think about cost/performance for LSI testing ?

Altogether focusing resources on results is the best and most effective cost control.

- Peter F. Drucker

Interpretation:

Just cost reduction is not important.

Cost/performance is important !

What do you think about balance between test cost and quality ?

If you do NOT think about cost, and
you just pursuit quality,
your company will get into bankrupt.

- Gen-ichi Taguchi

Proponent of Taguchi Method
God of quality control

What is the expected innovation and challenge for test cost reduction in the future ?

Konosuke Matsushita, the founder of Panasonic

(ex-Matsushita Electric Corp) said

“20% cost reduction is difficult but 50% cost reduction is not very difficult.”

If you consider cost reduction by 50%,

you can come up with new ideas.

Could you suggest your ideas

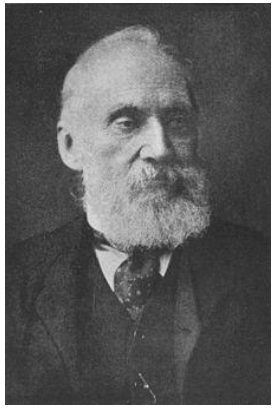
for test cost reduction by 50%.

Konosuke Matsushita

How do your LSI testing work make people (users of final products, your customers, your company, yourself) happy ?

Mr. Soichiro Honda,
the founder of Honda Motor Co., Ltd. said,
“The purpose of our technology is
to make people’s lives happier”.

What is your overall philosophy related to LSI testing ?



Lord Kelvin said:

There is no science without measurement.

LSI test related people would like to say:

There is no product without test.