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BiTS

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Test and Burn-in Socket Market Update

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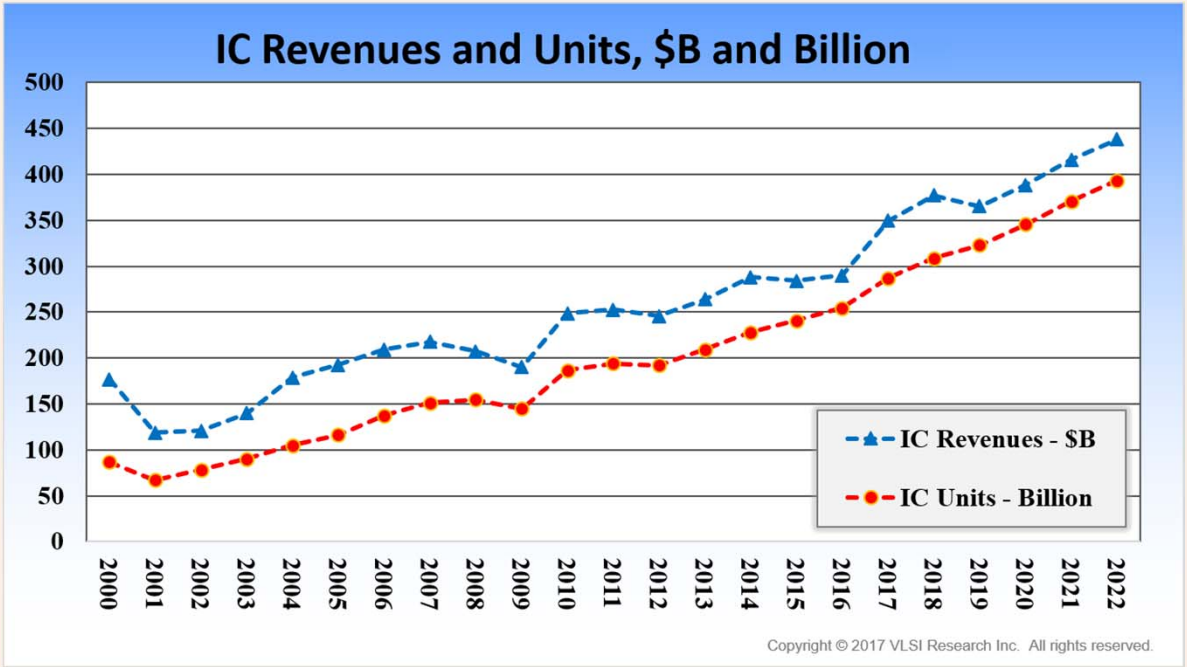
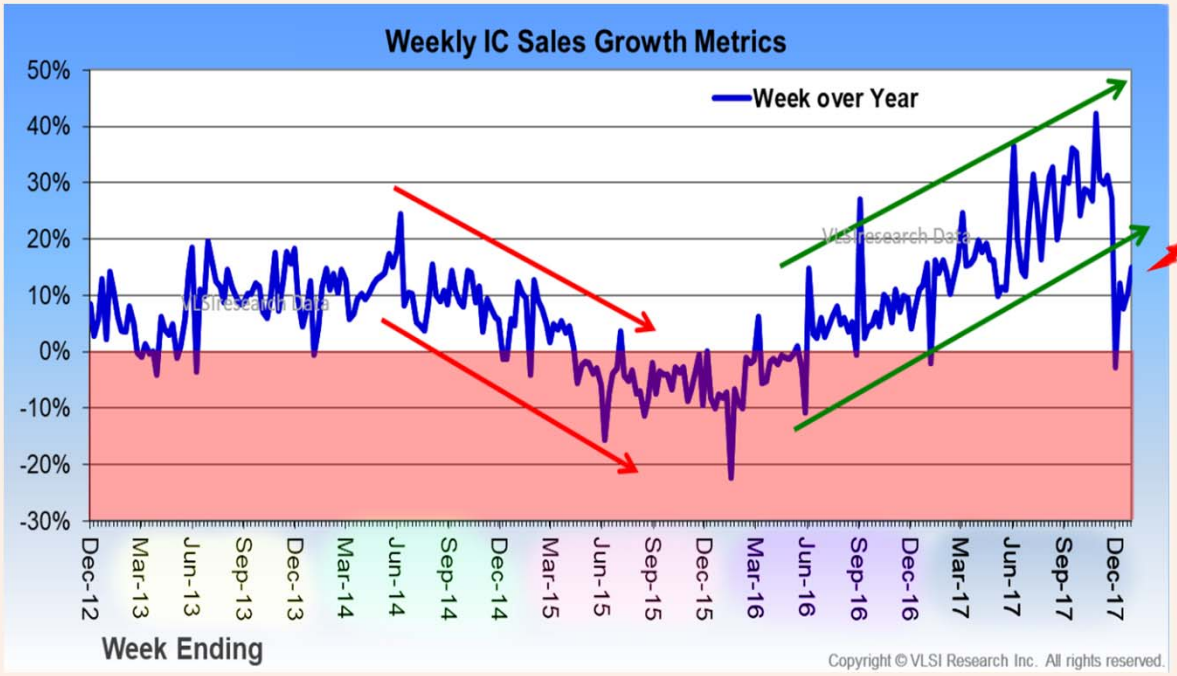
IC Revenues and Units



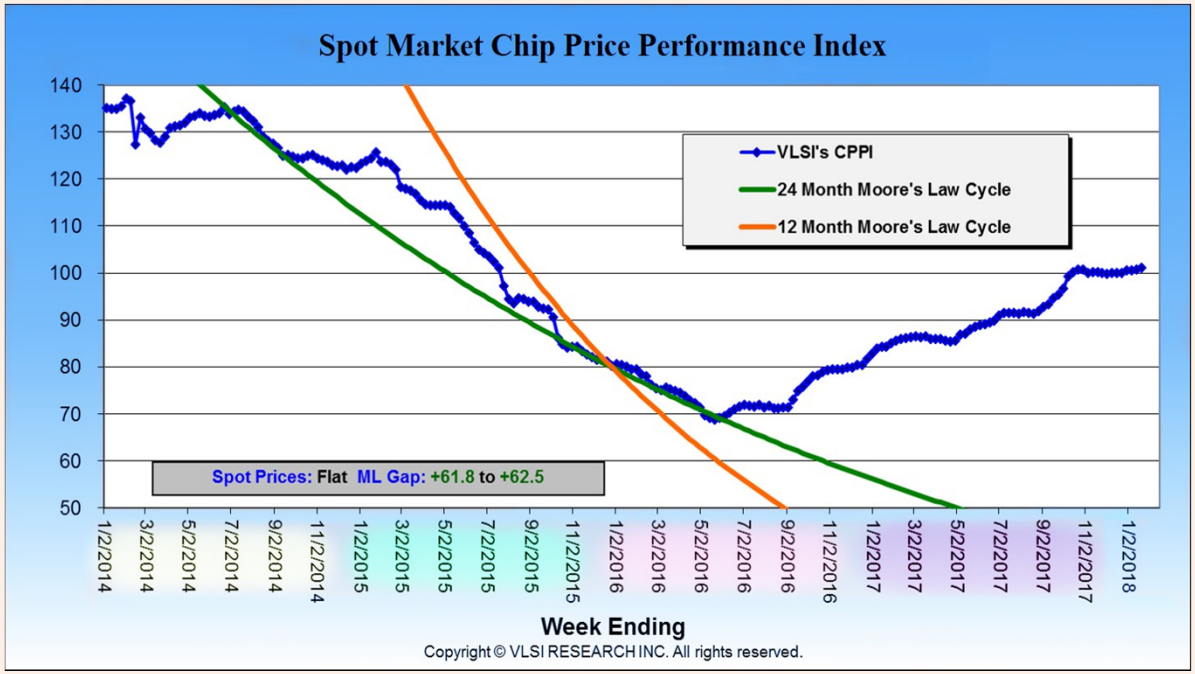
- Clearly, the IC market is on a continuous growth trend
- Y17 - Y22 CAGR : 4.6%
- Y18 annual growth : 7.8%

Week-Over-Year IC Sales Growth Trends



- Current upturn from beginning of Y16
- Peak w/w growth : 40%
- Always a correction at the end of Year
- Latest trend is on a growth path

Spot Market Chip Price Performance Index



- Strong pricing in Y17
- Trend continues in Y18
- Main price drivers in Y17
  - ---- DRAM up 73%
  - ---- Flash up 28%

IC Demand – Supply Balance

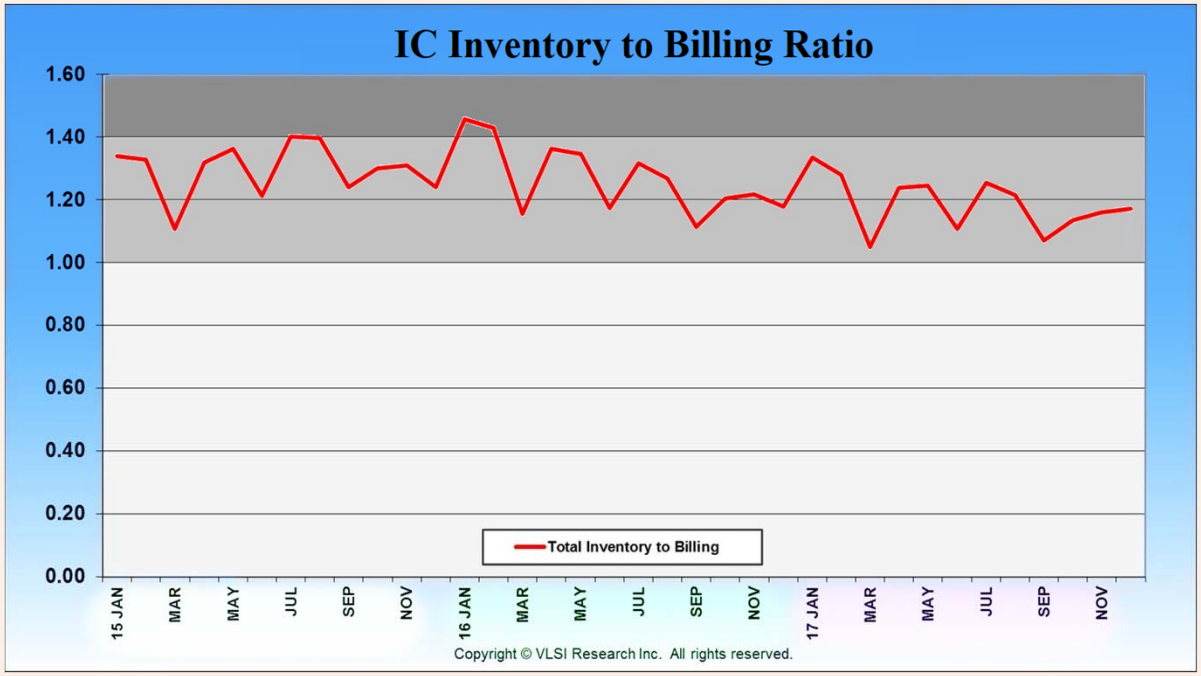
Pivot Points → / Week ↓	Overall	DRAM	NAND/NVM	IDM	Foundry/Fabless
	Capex has yet to ease memory shortage	Constrained CapEx created long-term shortage	Supply expanding into fixed demand growth	Cloud, IoT and Power strong	Mobile soft, 7nm pushouts
3Q 2016	Shortage	Shortage	Shortage	Shortage	Shortage
4Q 2016	Shortage	Shortage	Shortage	Shortage	Shortage
1Q 2017	Shortage	Shortage	Shortage	Shortage	Shortage
2Q 2017	Shortage	Balanced	Shortage	Shortage	Tight
3Q 2017	Shortage	Shortage	Shortage	Shortage	Balanced
4Q 2017	Shortage	Shortage	Shortage	Shortage	Balanced
1Q 2018 NowCast	Balanced	Shortage	Balanced	Balanced	Saturated
2Q 2018 Forecast	Balanced	Shortage	Shortage	Tight	Loose

Range: Shortage-Tight-Balanced-Loose-Saturated-Glut

IC demand – supply in Y17 : Shortage

IC demand – supply in Y18 : Balanced

IC Inventory to Billing Ratio



- Normal inventory to billing ratio : 1 ~ 1.4
- At the end of Y17, the inventories were at a healthy (1.2 months)

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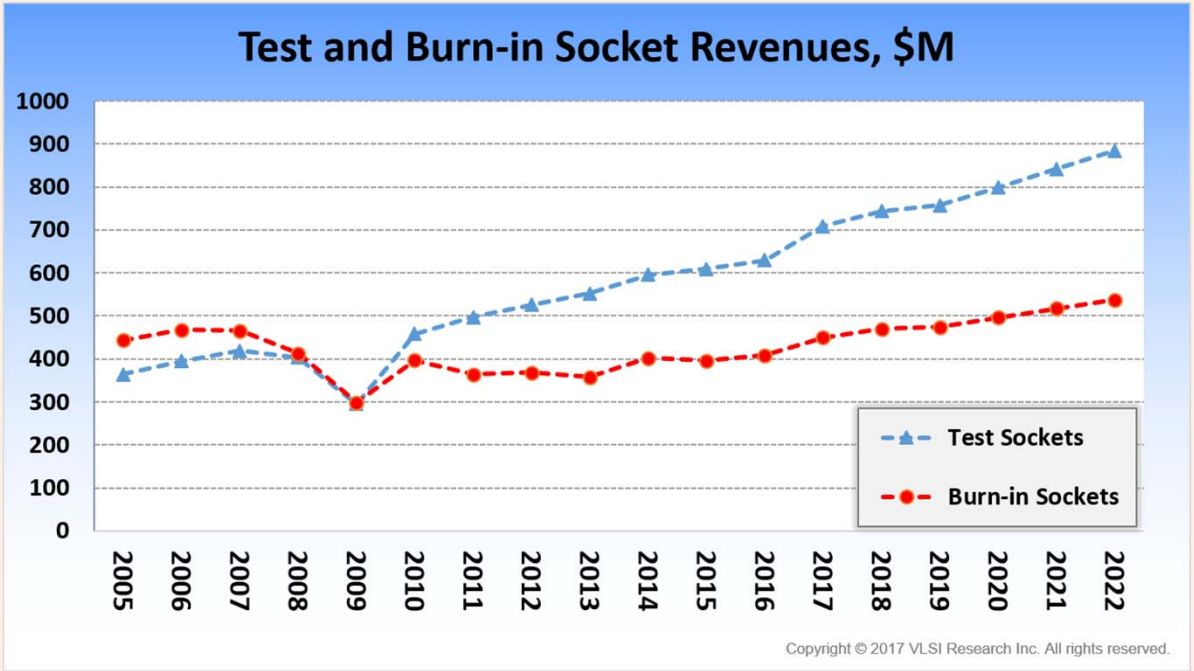
Test and Burn-in Sockets



- Test socket market:

  larger & growing faster

- Test socket CAGR:

  4.5% (Y17 - Y22)

- Burn-in socket CAGR:

  3.6% (Y17 - Y22)

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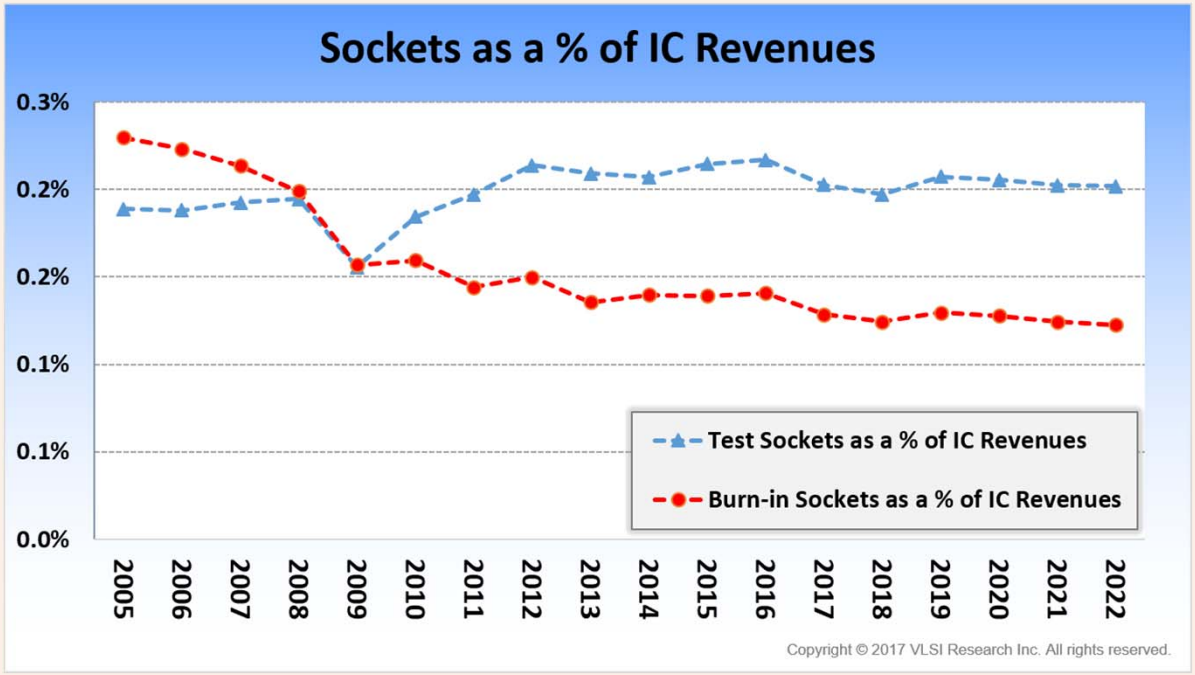
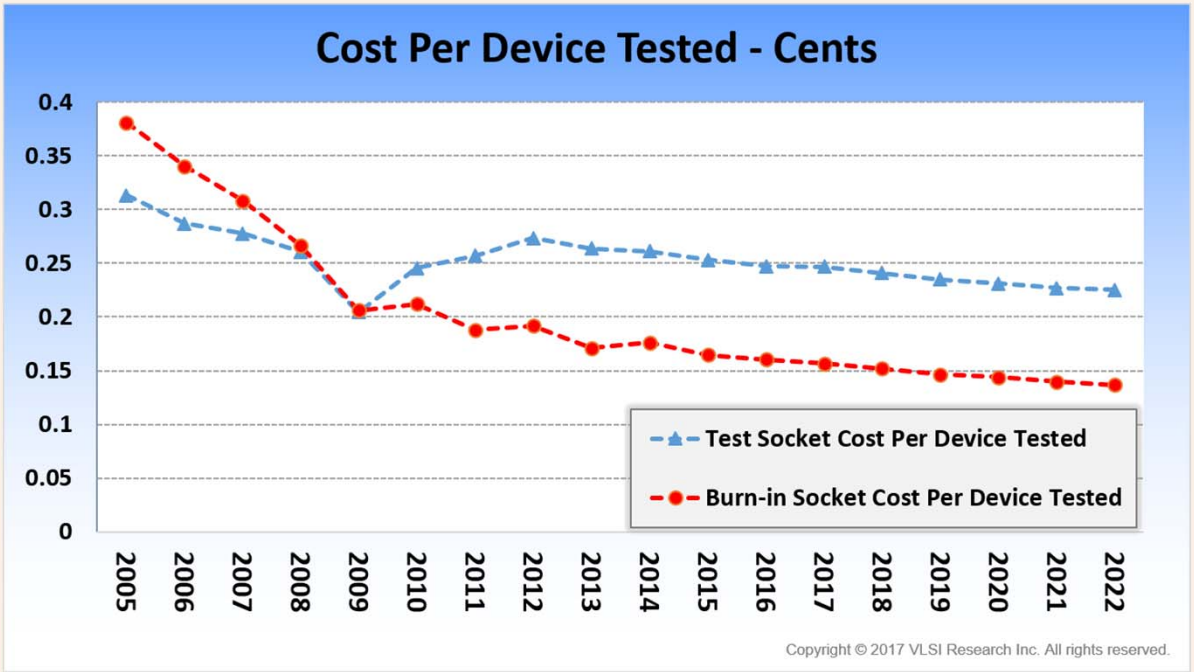
Cost of Test



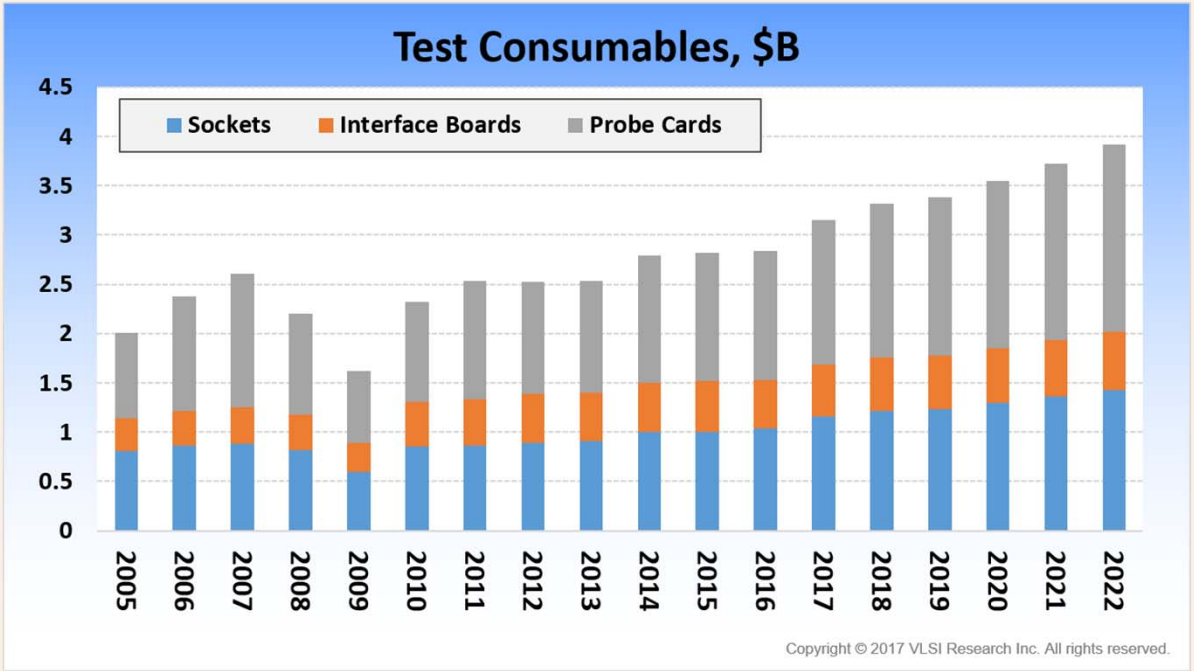
- Sockets as a % of IC revenues trending flat
- Historically, the trend has been downwards
- The challenge is to get back on a downwards path

Cost Per Device Tested



- Cost per device tested not falling down enough
- Cost of leading edge applications are going up

Test Consumables

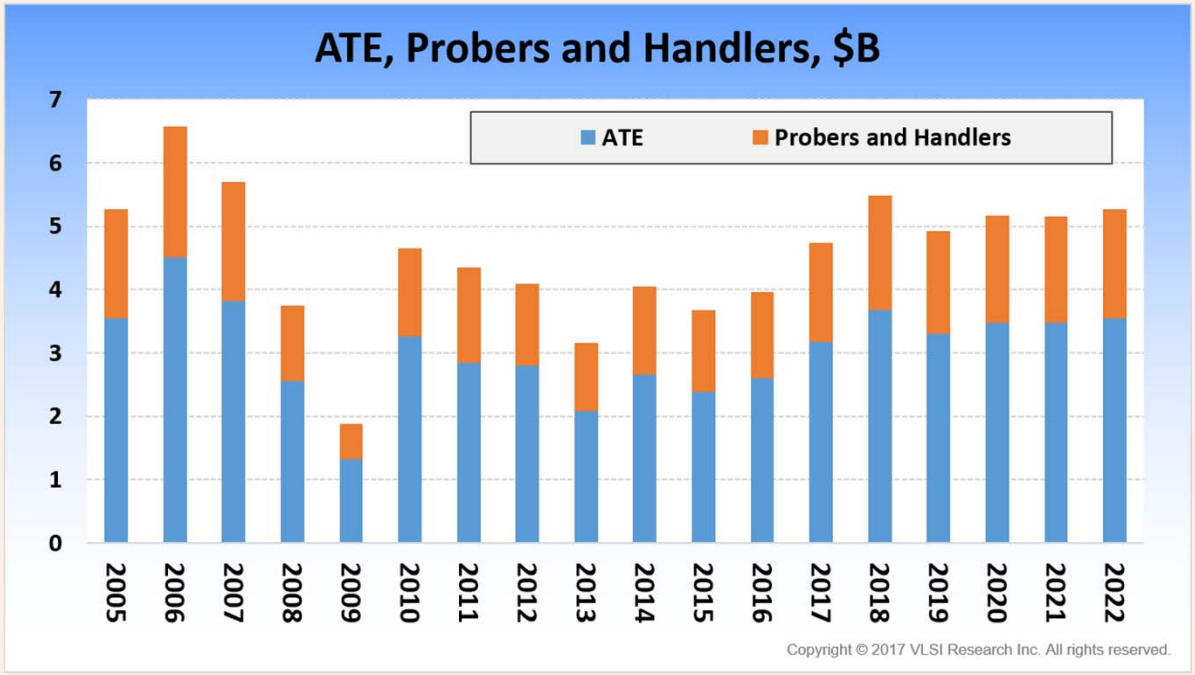


- Expenditure of test consumables :

  > $3B in Y17 with growth of 11%

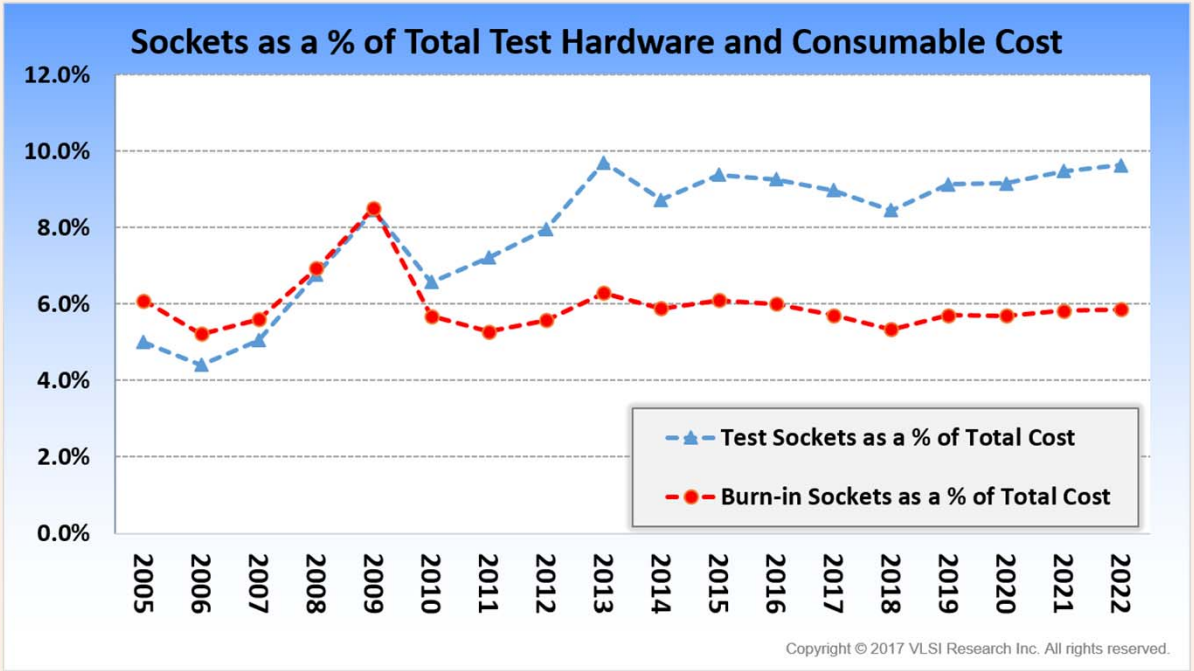
- Y17 - Y22 CAGR : 4.5%

Test Equipment



- Expenditure on test equipment trending down from Y06 to Y15
- Expenditure > $4.5B in Y17 with trending flat from Y18 to Y22

Sockets as a % of Total Cost



- Socket cost (Y17 to Y22):

8% to 10% - Test sockets

5% to 6% - Burn-in sockets

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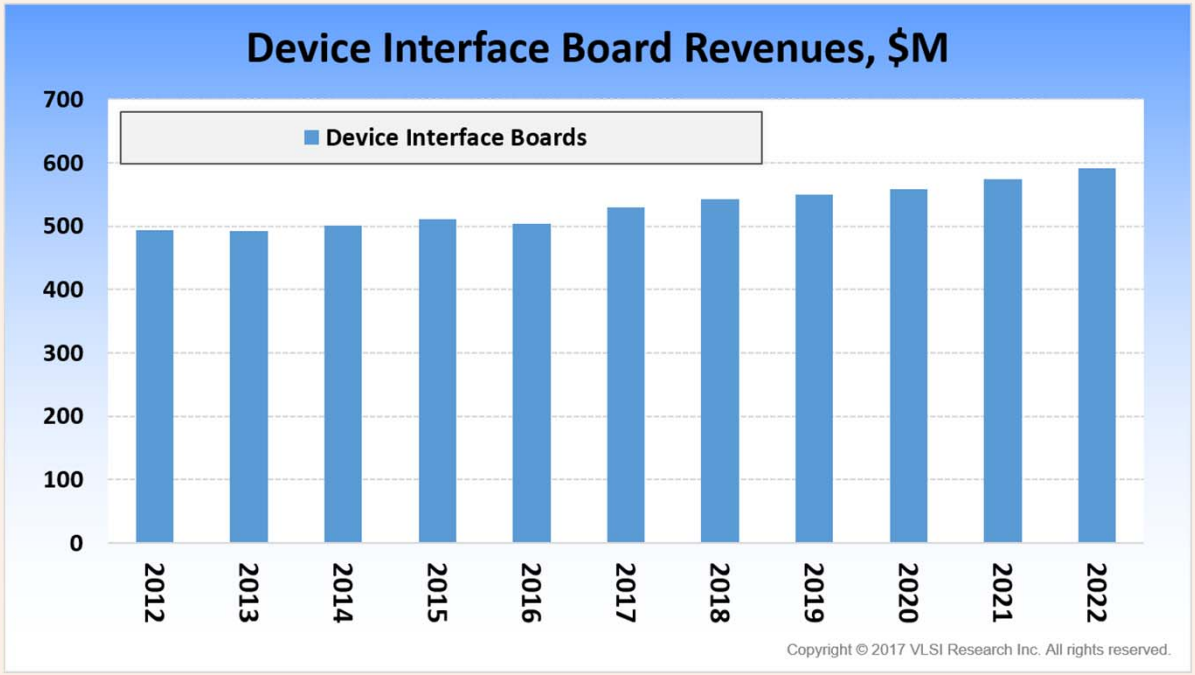
Device Interface Boards



Top DIB Vendors

R&D Altanova
Harbor Electronics
TSE

- Market size: > $500M

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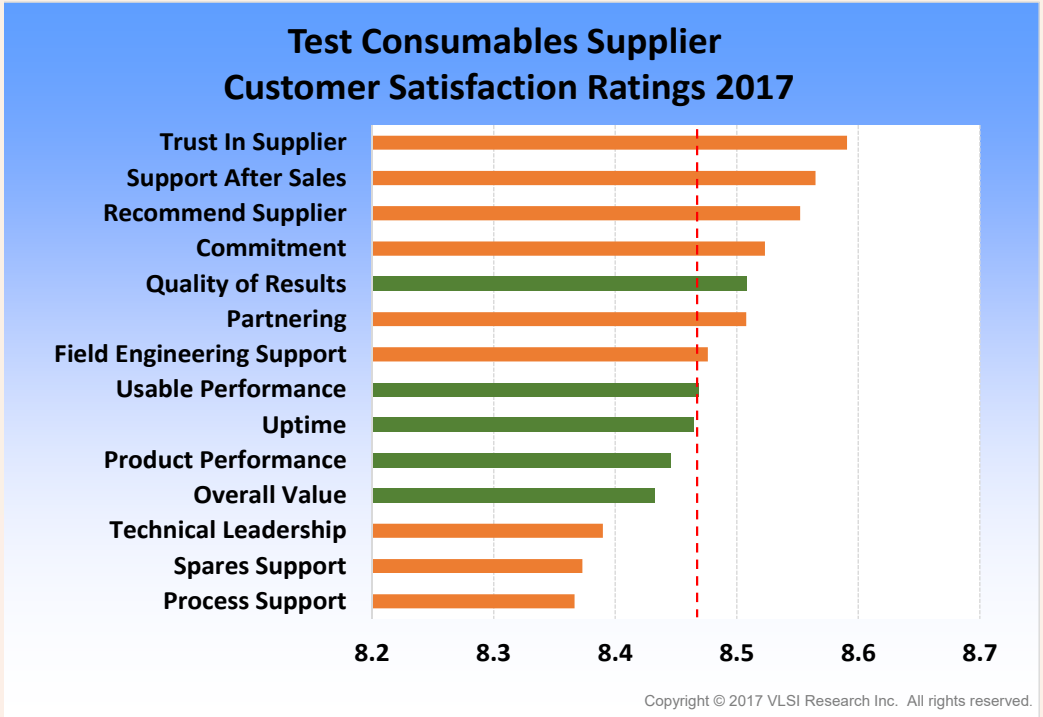
Customer Satisfaction Survey



- Orange: related to company
- Green: related to product
- Average Rating: 8.47
- Compares to an average rating of 8.53 for equipment

Conclusion

- Y17 - Y22 CAGR:
  - 4.6% for ICs
  - 4.5% for test sockets
  - 3.6% for burn-in sockets
- Y18 is expected to be a strong year
- Y19 could be a correction year with flat or downward trend