

AEM Holdings (AEM SP)

Game on

Intel news highly favourable for AEM; maintain BUY

We expect Intel to remain a sizeable customer of AEM and developments at Intel should be positive for AEM from: i) Intel's back-end capacity additions, which should underpin earnings in the coming years; and ii) 18A node being ahead of schedule, which should have positive implications for Intel's dominance. AEM has an extremely positive outlook for this and it's our top SG tech pick. Maintain BUY and TP of SGD6.34 (16x FY22E P/E).

Intel says 18A process node ahead of schedule

Intel recently announced its 18A process, 6 months ahead of schedule. It expects to be manufacturing ready by 2H24. This should help Intel regain manufacturing leadership. Intel said R&D for the node is on or ahead of milestones, imbuing confidence it can begin manufacturing on this node in 2024. As we expect Intel to continue to be a sizeable AEM customer, we believe this news has long-term positive implications for Intel's dominance and market share, and for demand for AEM's equipment.

Riding on Intel's spending plans; upbeat outlook

We see the 2022 ramp up of HDBI and HST test handlers as part a capex replacement cycle within Intel. This means equipment demand from back-end capacity expansion - which follows front-end capacity additions - remains "untapped" and should underpin prospects in coming years. AEM has an extremely positive outlook for this driver. As Intel builds up front-end capacity across the US and Europe to reduce chipmaking reliance on Asia, we believe AEM is a beneficiary as back-end capacity will be needed. As Intel's new Penang plant should begin operations in early FY24E, AEM could benefit from equipment shipment around 2H23, in our view.

Mitigating risks from supply disruptions

AEM recently noted that to date, it has not seen material direct impact from the Russia-Ukraine war, but remains mindful of risks of rising costs if the conflict prolongs. AEM has also built up inventory to ensure sufficiency for future deliveries, and has so far been able to contain the impact caused by supply chain disruptions.

FYE Dec (SGD m)	FY20A	FY21A	FY22E	FY23E	FY24E
Revenue	519	565	721	854	1,070
EBITDA	122	126	163	192	238
Core net profit	98	92	123	145	182
Core FDEPS (cts)	35.1	29.5	39.3	46.5	58.4
Core FDEPS growth(%)	80.9	(16.0)	33.4	18.1	25.6
Net DPS (cts)	9.0	7.6	9.9	11.7	14.7
Core FD P/E (x)	9.8	17.8	12.1	10.3	8.2
P/BV (x)	4.5	4.0	3.0	2.4	2.0
Net dividend yield (%)	2.6	1.4	2.1	2.5	3.1
ROAE (%)	56.4	30.0	27.3	26.4	27.1
ROAA (%)	34.6	17.6	16.4	16.9	17.7
EV/EBITDA (x)	6.7	11.0	7.8	5.9	4.2
Net gearing (%) (incl perps)	net cash	net cash	net cash	net cash	net cash
Consensus net profit	-	-	123	140	171
MKE vs. Consensus (%)	-	-	(0.4)	3.2	6.7

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BUY

Share Price SGD 4.77
 12m Price Target SGD 6.34 (+35%)
 Previous Price Target SGD 6.34

Company Description

AEM manufactures equipment used in the semiconductor back-end process

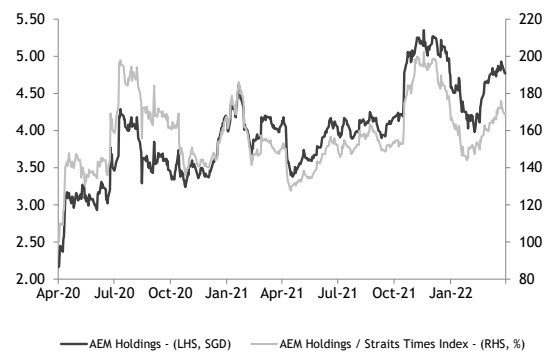
Statistics

52w high/low (SGD)	5.35/3.38
3m avg turnover (USDm)	9.4
Free float (%)	86.4
Issued shares (m)	312
Market capitalisation	SGD1.5B
	USD1.1B

Major shareholders:

Temasek Holdings Pte Ltd. (Investment Ma	12.0%
Aberdeen Standard Investments (Asia) Ltd	6.0%
Employees Provident Fund	4.8%

Price Performance



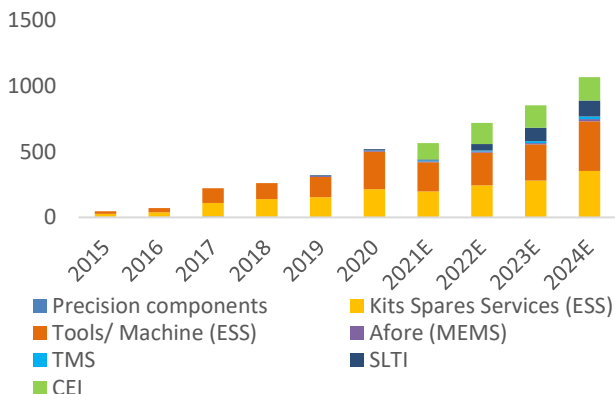
	-1M	-3M	-12M
Absolute (%)	3	1	17
Relative to index (%)	5	(1)	12

Source: FactSet

Value Proposition

- Back-end test-equipment manufacturer that has co-developed the HDMT handler for Intel.
- Leading-edge HDMT technology has helped its core customer achieve 2x savings in chip-testing costs.
- AEM provides strong synergies like field-service capabilities and manufacturing scale for the high-tech companies that it acquires.
- High single-customer and product risks.

Share of new revenue sources progressively growing



Note: FY21E split is our estimation.
Source: Company, Maybank IBG Research

Price Drivers

Historical share price trend



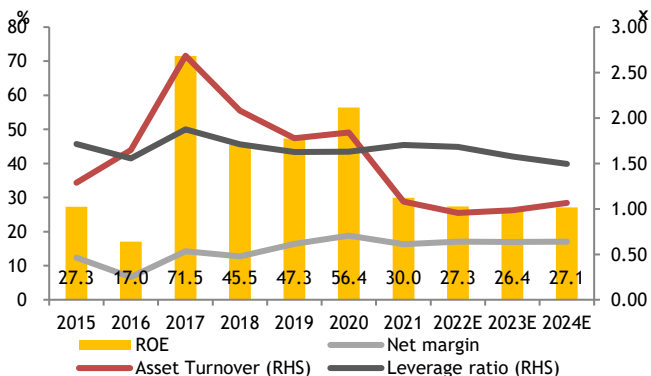
Source: Company, Maybank IBG Research

1. Novo Tellus distributes AEM shares in-specie to investors; Core customer announces 10nm delay.
2. AEM's core customer denies rumours from tech-blog SemiAccurate that its 10nm process was cancelled.
3. Through 2020, AEM announced several positive guidance revisions, catalysing rallies
4. Announced FY21 revenue guidance of SGD460-520m, which the market perceived as a disappointment.
5. Announced placement to Temasek.

Financial Metrics

- Over time, we expect increasing contributions from non-Intel revenue sources.
- AEM is not a capex-intensive company. Improved cash-flow from 2016 levels has allowed AEM to pursue highly synergistic acquisitions.
- Training a batch of engineers during pre-production ramp up could take 5-6 months. During such time, staff costs could be elevated and profitability could temporarily decline.
- Adopted 25% dividend payout ratio policy in 2017.

DuPont ROE



Source: Company, Maybank IBG Research

Swing Factors

Upside

- Revenue expansion from securing new customers or wallet expansion/increased orders from existing customers.
- Synergistic and accretive acquisitions.
- Positive customer-related news flow that could catalyse improved orders for AEM, such as capacity expansion or launch of new chips.

Downside

- Order cancellation, delays and earnings misses.
 - Emerging technology from rivals that could erode AEM's competitive position with customer(s).
- Erosion in the competitive advantages of the core customer as a result of company specific or industry related developments.

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Risk Rating & Score ¹	23.1 (Medium)
Score Momentum ²	NA
Last Updated	11 November 2020
Controversy Score ³	0 - No Reported Incident

Business Model & Industry Issues

- As an equipment maker, AEM is inherently exposed to environmental, workplace safety, and socio-economic risks. AEM has had zero incidences of environmental non-compliance, as well as zero substantiated cases of corruption and legal compliance issues in 2021.
- From an environmental and social perspective, AEM screens all of its suppliers. AEM constantly strives to be more efficient with electricity usage, and ensures employees are well trained and remunerated fairly.
- AEM is recognised for good transparency with shareholders, while still being able to balance business requirements (e.g. respecting non-disclosure agreements).
- AEM has several new products in the pipeline and it is engaging customers for more. In our view, this is the key for economic sustainability, as well as for development of its own employees.

Material E issues

- AEM's environmental exposure is through energy, water and inputs (fabricated parts and electronics).
- AEM adheres to all National Environment Agency laws and regulations and has not had incidences of environmental non-compliance over the past 10 years.
- Emissions intensity ratio rose to 0.0014318MT/SGD'000 in 2021 (FY19: 0.007588), due to the consolidation of CEI.
- AEM screens suppliers for negative environmental and social impacts, including pollution, biodiversity loss, global warming, incidences of child labour, breaches of customer privacy, and more. All suppliers were found to have no negative environmental or social impacts.

Material S issues

- AEM adheres to minimum wage laws of the countries it operates in. There is no difference in pay between male and female employees at the entry-level across all countries with minimum wage laws.
- Workforce diversity. AEM is an equal-opportunities employer. Management are hired from local communities and consists of various nationalities. >90% of management are local across AEM's footprint globally.
- Workplace safety. AEM trains its employees on health and safety work practices. In 2018, there was 1 minor injury.
- In 2021, average training per employee was 18.4 hours, to equip staff with skills across technical, project management and software domains (FY20: 7.8 hours).
- Females comprise 34% of the total work force in FY21, higher than 24% in FY20, due to the inclusion of CEI.
- Turnover rate rose to 23% vs. 10% in FY20.

Key G metrics and issues

- The board has seven directors, of which one is the executive chairman, four are independent directors (57%), and three are non-independent, non-executive. All the directors are male.
- The audit & risk management, remuneration, and nominating committees are chaired by independent directors. The strategy committee, which works with management on long-term strategic planning, is chaired by the executive chairman.
- Key management compensation (comprising the Board and senior management) accounted for 7.1% of staff costs in 2021 (2020: 13.6%).
- In 2019, AEM won "Most Transparent Company Award, Technology" and was runner up for the "Singapore Corporate Governance Award" by SIAS. AEM regularly updates on its sales guidance and orders received and it's active in engaging with the investment community.
- Zero substantiated cases of corruption or legal compliance issues in 2021. There was one case of whistleblowing in 2020, but upon investigation, it was concluded to be unsubstantiated.
- AEM was granted two patents in 2019, and the staff involved were rewarded. AEM views its considerable engineering development revenue as a positive sign of customer satisfaction and relationship.

¹**Risk Rating & Score** - derived by Sustainalytics and assesses the company's exposure to unmanaged ESG risks. Scores range between 0 - 50 in order of increasing severity with low/high scores & ratings representing negligible/significant risk to the company's enterprise value, respectively, from ESG-driven financial impacts. ²**Score Momentum** - indicates changes to the company's score since the last update - a **negative** integer indicates a company's improving risk score; a **positive** integer indicates a deterioration. ³**Controversy Score** - reported periodically by Sustainalytics in the event of material ESG-related incident(s), with the impact severity scores of these events ranging from Category 0-5 (0 - no reports; 1 - negligible risks; ...; 5 - poses serious risks & indicative of potential structural deficiencies at the company).

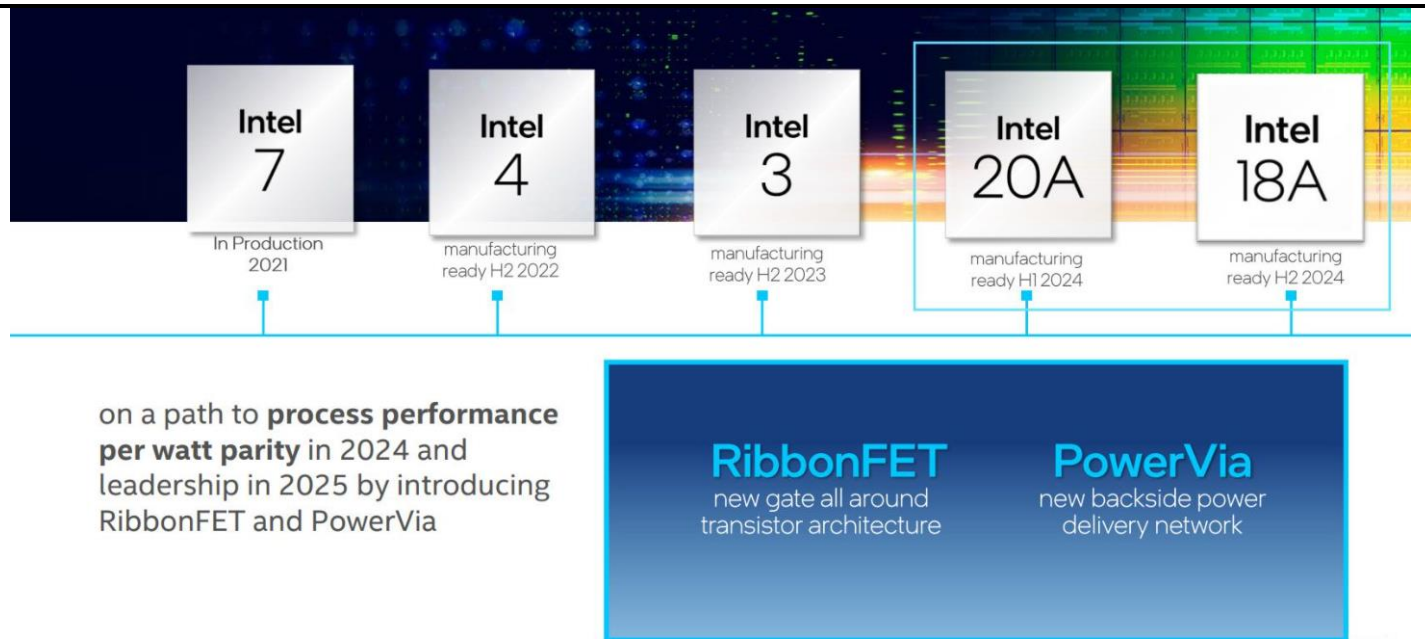
AEM could benefit from Intel’s 18A acceleration

At Intel’s D1X-Mod3 fab expansion event, it confirmed rumours that its 18A manufacturing process is 6 months ahead of schedule and is now expected to be manufacturing ready by 2H24 instead of 2025. We see this as a positive signal on Intel’s end, given this announcement was made so much ahead of time.

This could accrue positively over the longer horizon for AEM (i.e. likely 2025 and beyond) from:

- 1) Continued structural growth of test handler demand, on the back of rising transistor density and chip complexity;
- 2) Intel’s comeback in manufacturing leadership could provide a paradigm shift to win more foundry customers. If these customers leverage Intel’s test technology, the addressable market for AEM’s equipment could expand.


Fig 1: Intel’s 18A node, equivalent to 2nm, is brought forward by 6 months and is expected to be manufacturing ready by 2H24.



*Process readiness timing does not necessarily indicate product production timing. Learn more at www.intel.com/PerformanceIndex. Results may vary.

Source: Intel

Fig 2: Intel timelines

	Intel Timelines																Ramp/Retail may vary
	2022				2023				2024				2025				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
FET	FinFET								RibbonFET + PowerVia								
Process	Intel 7		Intel 4				Intel 3		Intel 20A		Intel 18A						
DUV / EUV	DUV		EUV										High-NA EUV				
EMIB	EMIB 55 micron				EMIB 45 micron												
Foveros	Foveros 50 micr		Foveros 36 micron														
Foveros Omni	© AnandTech (Original by Dr. Ian Cutress)						Foveros Omni, 25 micron										
Foveros Direct	https://www.anandtech.com/show/17344/						Foveros Direct, 10 micron 2-stack										

Source: AnandTech

Proxy to Intel’s quest to rebalance global chipmaking capacity

One of Intel’s priorities since CEO Pat Gelsinger took the helm is to expand Intel’s capacity in the US and Europe as part of a rebalancing of global chipmaking capacity. This is to reduce reliance on Asia, where 80% of chipmaking takes place. From online sources, we estimate that Intel has committed >USD70b worth of front-end fab capacity with completion dates between 2022-27 (our list may not be exhaustive).

Once front-end capacity comes online, there will also be an increase in demand for back-end test capacity as overall volumes increase. On the back of such dynamics, AEM sees its outlook as “generally very positive” this year and in coming years given the investment in front-end capacity.

For the Intel account, AEM’s 2022 equipment product mix largely consists HDBI and HST test handlers, and not much of HDMT (where capacity was ramped up in prior years). This leads us to conclude that the current product ramp is largely part of an equipment replacement/ upgrade cycle for existing manufacturing capacity. This implies that test equipment demand that may accrue to AEM is still “untapped”. Going by expectations that the Penang expansion should begin operations in early 2022, we anticipate a likelihood that equipment deliveries from capacity expansion should take place within the vicinity of 2H23 onwards. As part of Intel’s Europe push, it is now in negotiations with Italy to build a back-end facility for advanced packaging and test - which if goes through - should begin operations in 2025-27. We believe this is also favourable for AEM in the long-term.

Fig 3: Key new fabs/ fab expansion by Intel (list may not be exhaustive)

	Value announced (USD\$b)	Announcement date	Est. completion date	Comments
Front-end fabs				
Oregon	3.0	Feb-19	2022	Fab expansion. Ribbon cutting in Apr-22
Arizona	20.0	Mar-21	2024	2 new fabs. Broke ground in Sep-21
Ireland	13.0	Mar-22	2023	Fab expansion. For Intel 4 process and to expand foundry business in Europe.
Germany	18.4	Mar-22	2027	2 new fabs. To start construction in 1H23. To produce "angstrom" era chips (e.g. 20A/ 18A and beyond). First phase of plans to invest up to EUR80b in EU over 10 years.
Ohio	20.0	Jan-22	2025	2 new fabs. Construction to begin in 2H22
Total value	74.3			
Back-end plants				
New Mexico	3.5	May-21	2022	Expansion for advanced packaging plant
Penang	7.1	Dec-21	2024	Advanced packaging and test plant. USD7b investment over 10 years.
Italy (in negotiations)	9.7	Dec-21	2025-2027	Initial phase of EUR4.5b. Rome is reportedly ready to fund as much as 40% of the investment.
Total value	20.3			

Source: Various sources, Intel

Adopting the Test 2.0 paradigm

High-end device segments such as high performance computing, mobility and automotive require test coverage beyond what is currently achievable with traditional ATE (automatic test equipment) and existing test flow.

The requirement to adopt system level test to complement existing test flow is changing test economics. According to AEM, this is forcing chipmakers to re-evaluate their back-end test flow and look to a Test 2.0 (AEM's approach) paradigm to be more cost-efficient. This is taking place regardless of whether potential customers are already heavily invested in ATE or not, and also regardless of the replacement cycle of the ATE. Test 2.0 leverages big data, intelligent automation and application-specific instrumentation to test devices at both the device level and the system level.

Meanwhile, drivers of system level test adoption include (Fig 6):

- **Process node shrinks:** Certain high-end devices (e.g. AI) may contain billions of transistors. Even a 99.5% fault coverage leaves a large number of transistors untested, and the costs to improve coverage is exponential. SLT finds the faults in the remaining 0.5% of the untested transistors.
- **Rising hardware and software complexities:** As chipmaking innovation improves, complexity rises. This creates more effort to achieve the 99.5% ATE fault coverage. SLT is an easier and less expensive way to test complex devices.
- **Advanced packaging and thermal challenges:** Advanced packaging introduces new fault modes that are best identified by testing in mission mode (i.e. testing the device in the same mode of operation that it will actually be used). Heterogeneously packaged chips are also more vulnerable to temperature-

related defects compared to monolithic dies - hence, the need to test for reliability at extreme temperatures.

- Accelerating time to market and application specificity: High-end chips are getting increasingly mission critical. At the same time, chipmakers face shorter time to market and higher defects on new processes. SLT allows for improved fault coverage early in the device development. AEM’s solutions are highly configurable to the application specificity for the different requirements of various customers.

Fig 4: Historically, final test, dominated by ATEs, captured the most amount of relative capital investment



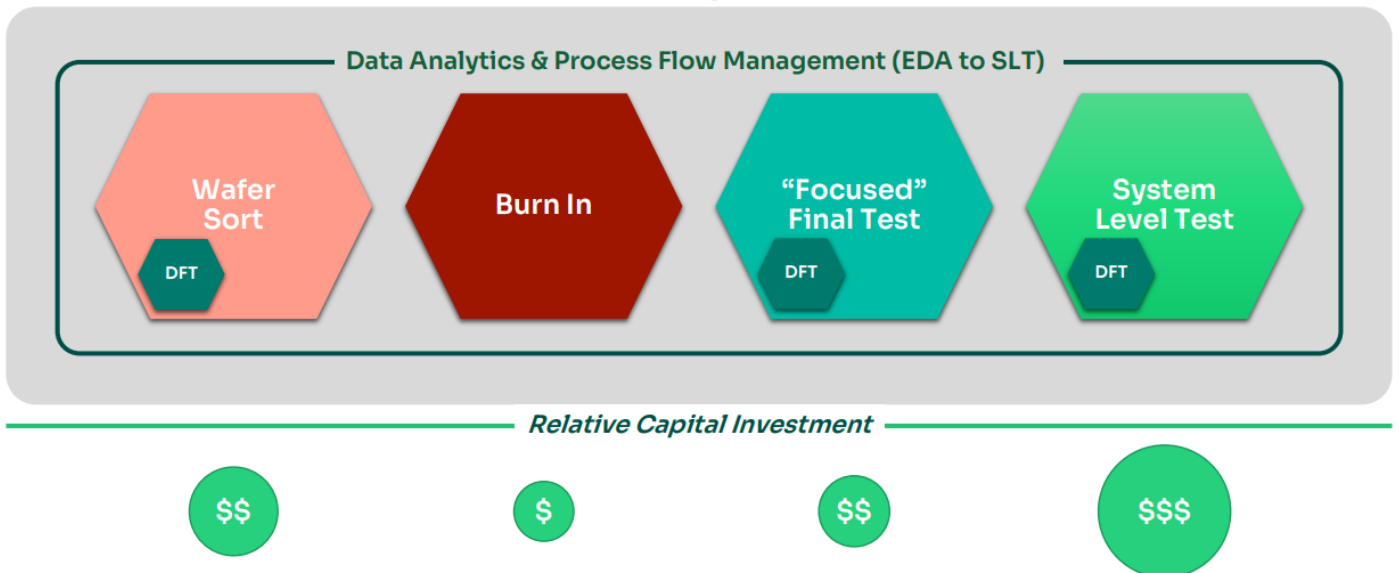
Source: Company

Fig 5: AEM envisions that with its Test 2.0 approach, system level test will capture increasing relative capital investment.

AEM’s Test 2.0 vision leverages data with intelligent automation and application specific solutions to reset the cost of test curve across backend test



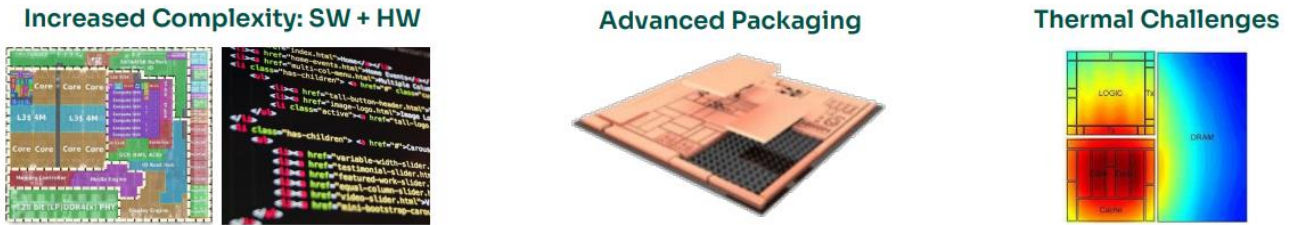
Future Paradigm: Test 2.0



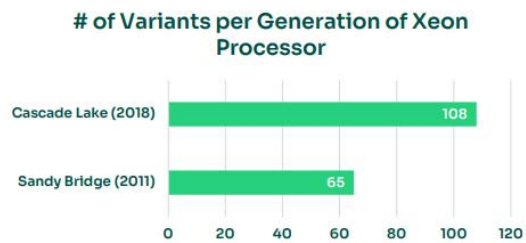
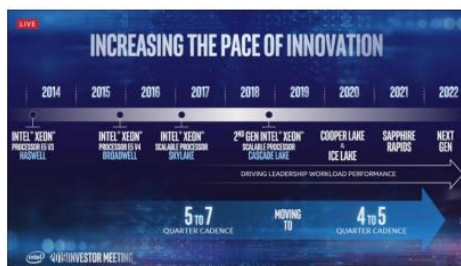
Source: Company

Fig 6: Drivers of system level test adoption

Industry innovations are challenging the industry’s ability to provide an assurance of quality at the lowest cost possible



Application Specificity Driving Increased Pace of Innovation



Source: Company

Risks and mitigation

On 23 April, AEM updated that it has not experienced major direct impact from the prolonged Russia-Ukraine conflict to date. However, it is cognizant of risks of higher cost pressures on the back of higher energy prices, supply chain disruptions and higher commodity prices.

As part of managing supply chain disruptions, AEM is proactive with inventory management, including by building a prudent level of inventory expected to be utilised for production. So far, AEM has been able to contain the impact of the disruptions.

Amid expectations of slowing PC demand, a risk is if AEM might see some mid-cycle earnings moderation in 1H23 (i.e. in between the current 2022 replacement cycle and the expected 2H23 ramp for Intel’s new Penang capacity).

FYE 31 Dec	FY20A	FY21A	FY22E	FY23E	FY24E
Key Metrics					
P/E (reported) (x)	8.4	13.0	12.0	10.2	8.1
Core P/E (x)	9.7	16.6	12.0	10.2	8.1
Core FD P/E (x)	9.8	17.8	12.1	10.3	8.2
P/BV (x)	4.5	4.0	3.0	2.4	2.0
P/NTA (x)	4.5	4.0	3.0	2.4	2.0
Net dividend yield (%)	2.6	1.4	2.1	2.5	3.1
FCF yield (%)	8.0	nm	6.7	11.6	12.5
EV/EBITDA (x)	6.7	11.0	7.8	5.9	4.2
EV/EBIT (x)	7.2	12.4	8.6	6.5	4.6
INCOME STATEMENT (SGD m)					
Revenue	519.0	565.5	720.6	853.7	1,069.8
EBITDA	121.6	126.3	163.1	191.6	237.9
Depreciation	(8.4)	(14.5)	(15.5)	(17.1)	(18.7)
Amortisation	0.0	0.0	0.0	0.0	0.0
EBIT	113.2	111.8	147.6	174.4	219.2
Net interest income / (exp)	0.4	(1.3)	(0.8)	(0.8)	(0.9)
Associates & JV	0.2	0.6	1.0	1.0	1.0
Exceptionals	0.0	0.0	0.0	0.0	0.0
Other pretax income	0.0	0.0	0.0	0.0	0.0
Pretax profit	113.8	111.1	147.8	174.6	219.3
Income tax	(16.2)	(19.1)	(25.1)	(29.7)	(37.3)
Minorities	0.0	(0.1)	0.0	0.0	0.0
Discontinued operations	0.0	0.0	0.0	0.0	0.0
Reported net profit	97.6	92.0	122.7	144.9	182.0
Core net profit	97.6	92.0	122.7	144.9	182.0
BALANCE SHEET (SGD m)					
Cash & Short Term Investments	134.8	216.2	283.7	418.7	559.2
Accounts receivable	47.6	127.9	148.5	155.6	166.8
Inventory	79.7	204.9	191.9	215.5	255.8
Property, Plant & Equip (net)	8.1	26.1	20.6	11.5	0.8
Intangible assets	56.2	96.9	96.9	96.9	96.9
Investment in Associates & JVs	4.7	15.9	16.9	17.9	18.9
Other assets	4.5	22.6	22.6	22.6	22.6
Total assets	335.5	710.5	781.0	938.6	1,120.9
ST interest bearing debt	0.0	20.5	20.5	20.5	20.5
Accounts payable	83.7	181.0	176.1	225.0	269.8
LT interest bearing debt	0.0	60.8	60.5	60.5	61.5
Other liabilities	40.0	46.0	29.0	29.0	29.0
Total Liabilities	124.1	308.0	286.5	335.4	381.2
Shareholders Equity	211.4	402.5	494.5	603.2	739.7
Minority Interest	0.0	0.0	0.0	0.0	0.0
Total shareholder equity	211.4	402.5	494.5	603.2	739.7
Total liabilities and equity	335.5	710.5	781.0	938.6	1,120.9
CASH FLOW (SGD m)					
Pretax profit	113.8	111.1	147.8	174.6	219.3
Depreciation & amortisation	8.4	14.5	15.5	17.1	18.7
Adj net interest (income)/exp	0.0	0.0	0.0	0.0	0.0
Change in working capital	(27.2)	(98.8)	(28.7)	18.2	(6.8)
Cash taxes paid	(8.8)	(14.1)	(25.1)	(29.7)	(37.3)
Other operating cash flow	0.0	0.0	0.0	0.0	0.0
Cash flow from operations	86.0	12.1	108.4	179.3	193.0
Capex	(10.2)	(32.5)	(10.0)	(8.0)	(8.0)
Free cash flow	75.9	(20.4)	98.4	171.3	185.0
Dividends paid	(22.2)	(23.5)	(30.7)	(36.2)	(45.5)
Equity raised / (purchased)	4.9	136.5	0.0	0.0	0.0
Change in Debt	0.0	81.3	(0.3)	0.0	1.0
Other invest/financing cash flow	(31.5)	(97.5)	0.0	0.0	0.0
Effect of exch rate changes	0.0	5.1	0.0	0.0	0.0
Net cash flow	27.1	81.4	67.5	135.0	140.5

FYE 31 Dec	FY20A	FY21A	FY22E	FY23E	FY24E
Key Ratios					
Growth ratios (%)					
Revenue growth	60.6	9.0	27.4	18.5	25.3
EBITDA growth	74.9	3.9	29.1	17.5	24.2
EBIT growth	77.9	(1.2)	32.0	18.2	25.6
Pretax growth	78.1	(2.3)	33.0	18.1	25.6
Reported net profit growth	84.3	(5.8)	33.4	18.1	25.6
Core net profit growth	84.3	(5.8)	33.4	18.1	25.6
Profitability ratios (%)					
EBITDA margin	23.4	22.3	22.6	22.4	22.2
EBIT margin	21.8	19.8	20.5	20.4	20.5
Pretax profit margin	21.9	19.7	20.5	20.5	20.5
Payout ratio	25.4	23.9	25.0	25.0	25.0
DuPont analysis					
Net profit margin (%)	18.8	16.3	17.0	17.0	17.0
Revenue/Assets (x)	1.5	0.8	0.9	0.9	1.0
Assets/Equity (x)	1.6	1.8	1.6	1.6	1.5
ROAE (%)	56.4	30.0	27.3	26.4	27.1
ROAA (%)	34.6	17.6	16.4	16.9	17.7
Liquidity & Efficiency					
Cash conversion cycle	16.2	65.3	83.8	66.1	48.3
Days receivable outstanding	26.2	55.9	69.0	64.1	54.2
Days inventory outstanding	70.2	135.2	147.9	128.2	118.4
Days payables outstanding	80.3	125.8	133.2	126.2	124.3
Dividend cover (x)	3.9	4.2	4.0	4.0	4.0
Current ratio (x)	2.4	2.3	2.9	3.0	3.2
Leverage & Expense Analysis					
Asset/Liability (x)	2.7	2.3	2.7	2.8	2.9
Net gearing (%) (incl perps)	net cash	net cash	net cash	net cash	net cash
Net gearing (%) (excl. perps)	net cash	net cash	net cash	net cash	net cash
Net interest cover (x)	na	84.4	nm	nm	nm
Debt/EBITDA (x)	0.0	0.6	0.5	0.4	0.3
Capex/revenue (%)	2.0	5.7	1.4	0.9	0.7
Net debt/ (net cash)	(134.8)	(134.9)	(202.7)	(337.7)	(477.2)

Source: Company; Maybank IBG Research

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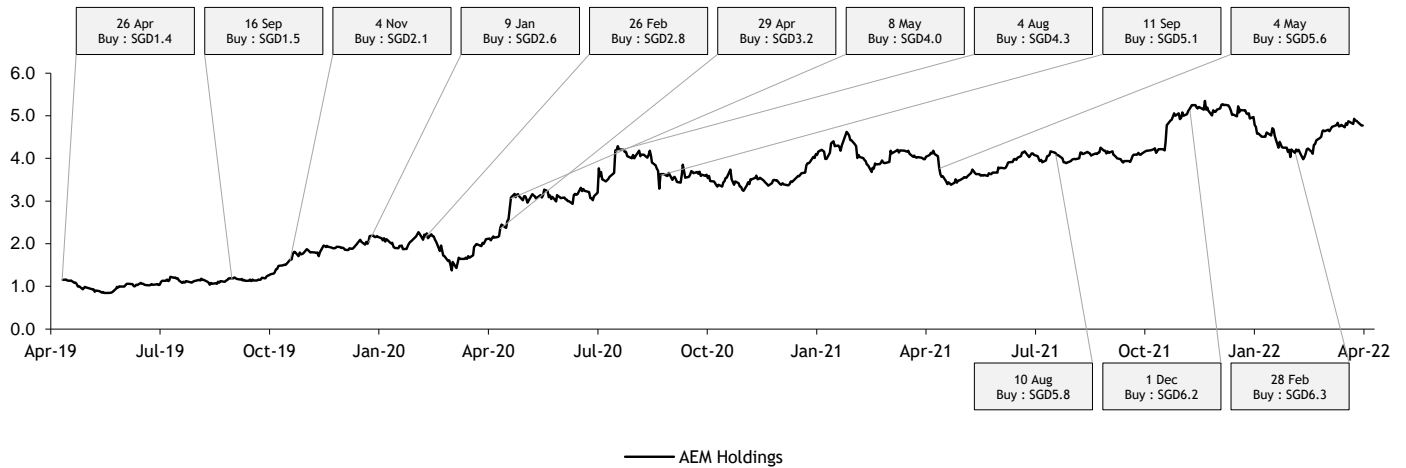
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