AEM Holdings (SGX: AWX)

Investment Analysis
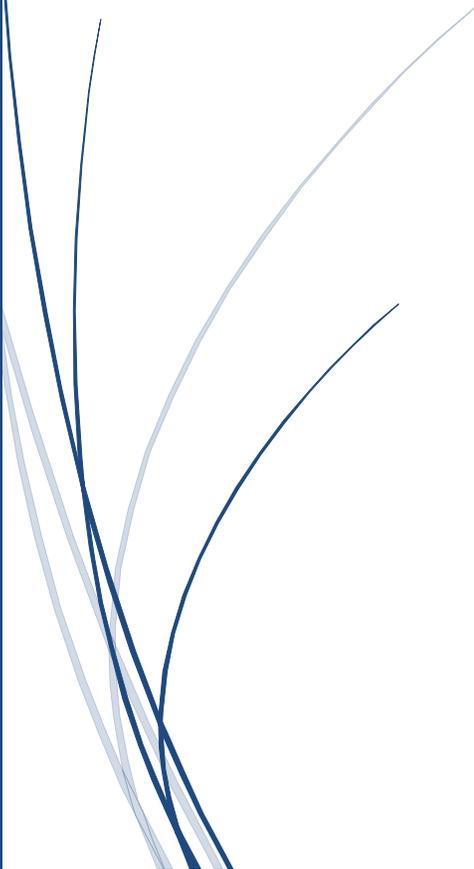
Singapore Bulls, National University of Singapore

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EXECUTIVE SUMMARY

AEM Holdings (SGX: AWX)
Recommendation: BUY
Report Date: Nov 6, 2019

AEM Holdings

INVESTMENT HIGHLIGHT

The AEM holding company is a Singapore listed electronic back-end testing company. It mainly provides testing solutions to semiconductor CPU manufacturers. The company has a global presence in Asia, the US and Europe. We recommend BUY this stock due to the following reasons:

1. Strong business performance with high demand of semiconductor back-end testing.

High Density Modular Test ("HDMT") handler system is the most successful product that generated strong cash flow to the company, and it will continue making strong sales in the coming years due to the high demand of the semiconductor industry. Thus, AEM has raised FY2019 guidance from $255M to $310M in Q3 report.

2. Growth opportunity in data centric industry and 5G

Due to the fast developing of 5G, IoT and cloud service, data center becomes the most important part of the technology world. The high demand for server CPU leads to a strong demand for the CPU back-testings. AEM is exactly in this business and will be hugely benefited from the booming market.

3. Healthy financial condition with abundant cash and strong EPS growth

Cash flow keeps strong compared to its current liability, and China region had an outstanding 470% growth in revenue. Additionally, EPS continuous increased in the last 4 years, climbed to historical high in 2019.

Company Statistics （Currency in SGD)

Bloomberg Ticker	AEM SP
Current Price	**1.63**
Target Price	**3.04**
52 weeks range	0.79-1.65
Avg 3M trading volume	7.35M
Market Cap	440.11M
P/E Ratio	10.9

5 Years AEM Stock price performance vs STI

Financial Highlights

In Millions	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	TV
Revenue	310	403	483.6	531.96	558.56	586.49	615.81	646.6
EBIT	40.3	52.39	62.87	69.15	72.61	76.24	80.06	84.06
FCFF	24.61	20.36	35.61	29.62	41.07	32.75	44.35	36.33
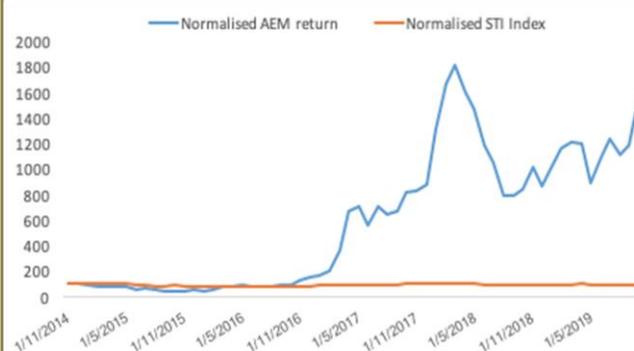
MARKET OVERVIEW

FROM A COMPUTE-CENTRIC INDUSTRY TO A DATA-CENTRIC INDUSTRY
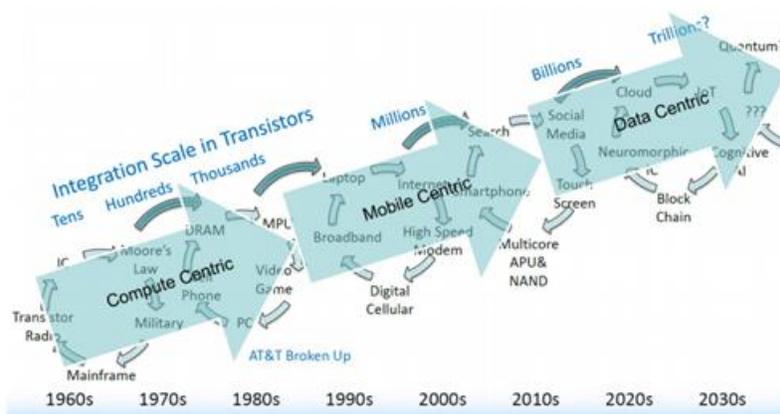
Source: VLSI Research, ISS US January 2018

As seen on the graph above, the semiconductor market is changing eras of demand. Companies evolve from being computer centric (CAGR of 0%) towards being data centric (CAGR of 15%).

AEM's key customer Intel, has successfully followed this transition. Originally having 80% of its revenues from the PC market, in FY18 over half of Intel's solutions are targeted to data centric markets (markets from memory, programmable solutions and data center processors).

5G AND THE RELATED CHIPSET TESTING MARKET IS PROJECTED TO BE GROWING AT A CAGR OF > 40% YOY

One of the world's leading telecom companies, Huawei Technologies, has chosen AEM's test solution developed in collaboration with China Electronics Technology Group Corporation No.23 Research Institute ("CETC23") for qualifying high-performance short reach cabling links for Huawei's 5G backhaul network. AEM indicated that the first solution will be delivered in a small batch to Huawei's labs in 2019E, before a further production ramp-up in 2020E.

2019 marks the year for 5th-Generation Wireless Systems (5G) to come to life, with large scale 5G roll-out and more than thirty 5G devices rushing into the market, including 5G smartphones and customer-premises equipment (CPE). With projected number of users of more than 10 million by the end of 2019, 5G is being touted as the main catalyst of the next big revolution. Spectrum sharing chipsets are already in development and are anticipated to be in 5G commercial devices in late 2019.

The global 5G chipset market is experiencing steady growth in the forecast period. The global 5G Chipset market size is expected to be $2,120.0 million in 2020, and is projected to reach $22,929.0 million by 2026, registering a CAGR of 48.7% from 2020 to 2026. Asia-Pacific is expected to be the highest contributor to the global market, with $752.6 million in 2020, and is estimated to reach $8,713.0 million by 2026, registering a CAGR of 50.5% during the forecast period. The semiconductor industry is rapidly growing owing to the surge in demand in a range of industries such as automobile, industrial manufacturing, defense, and consumer electronics including others.

TWO OF THE MAJOR PLAYERS IN 5G ARE AEM'S CLIENTS

The top players profiled in the 5G market are Qualcomm Technologies, Inc., Broadcom, Intel Corporation, Huawei Technologies Co., Nokia Corporation, Samsung Electronics Co., and Infineon Technologies AG. Of this portfolio, two are major customers of AEM Holdings and Qualcomm is a potential customer.

The combined advantage of AEM's high performance communications cabling test system and expertise in automating the test environment will enable them to achieve the stringent quality and cost targets for 5G component testing by their customer and its suppliers as well as other customers of the suppliers as 5G network is being rolled out.

5G market forecast

Global mobile data traffic (EB per month)

Ericsson Mobility Report June 2019
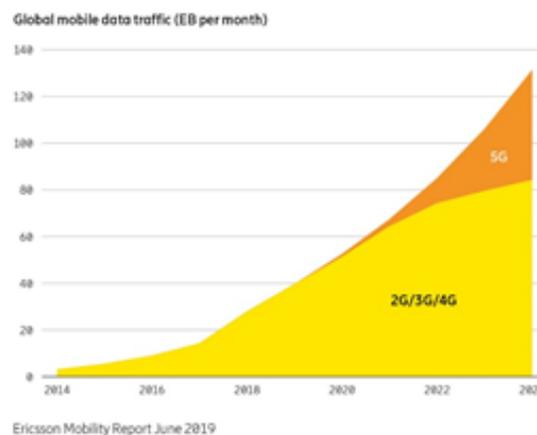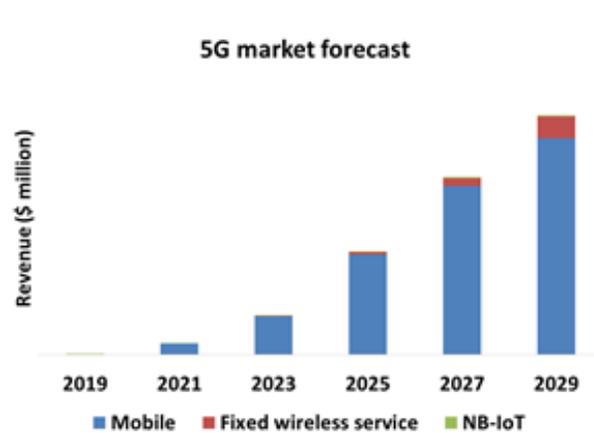
AEM SURFS THE WAVE OF ITS KEY CUSTOMER MARKET

The Total Addressable Market ("TAM") for AEM Holdings is directly impacted by the industry of AEM's key customer, Intel. Hence, the upside potential for the TAM comes from Intel's expansion initiatives, launch of new types of chips and general demand for the customer's products.

AEM's products can be divided into high-margin consumables and low-margin equipment. Consumables represent all complementary products to the testing equipment solution, namely kits, pans, maintenance and other services. These offerings are triggered by wear-and-tear, development of new chips and other one-off, ad-hoc technology driven initiatives demanded by the customer.

AEM positions itself in a way to be closely linked with the customer's new chip development and hence the provision of customized solutions.

COMPANY OVERVIEW

Founded in 1990 and publicly listed in 2000, AEM was started as an automation company, and over time, started focusing on automating the semiconductor back-end testing. Now AEM stands has a niche standing as one of Singapore's most established global providers of equipment systems solutions and manufacturing services, with a global market presence spanning Asia, Europe and the US. AEM provides handling and test solutions to the most advanced manufacturers in different sectors, including semiconductors, solar cells, advanced communications and so on. Having developed a deep knowledge base for integrating complex solutions, the company can support its customers throughout the lifecycle of a program – from design and tool development to mass volume production and field service engineering support.

Manufacturing facilities and sites			
Country	Locations	Business	Acquisition
Singapore	Serangoo North	·Headquaters	
		·Equipment systems solutions	
		·Test and measurement solutions	InspiRain 2017
		·Precision component solutions	
		·Machine vision soluti	IRIS 2018
Malaysia	Penang	·Equipment systems solutions	
		·Precision component solutions	
		·Field service	
China	Chengdu, Suzhou	·Equipment systems solutions	
		·Precision component solutions	
		·Field service	
Finland	Lieto	·MEMS testing solutions	Afore Oy 2018
USA	Chandler, Oregon	·Field service	
Vietnam	Ho Chi Minh	·Field service	

CORE BUSINESS

AEM mainly derives its sales from 2 business verticals. The most important customer of AEM accounted for 94% of AEM's revenue in 2018. Based on our investigation, this major customer is Intel, which has a significant influence on the financial performance of AEM and is a market leader itself as well.

Revenue by segment (millions)

5.7
122.2
134.4

■ Tools/Machine (EES) ■ Kits, Spares & Services (EES) ■ Precision Components
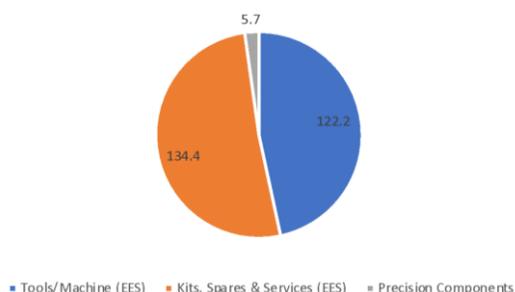
Revenue by customer (millions)

15.8
246.5

■ Customer A ■ Others
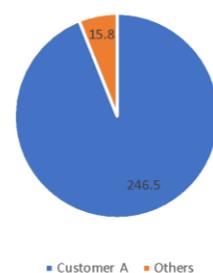
AEM majorly provides the following services:

1. **Equipment systems solutions (ESS)**: AEM specializes in providing customized system solutions, including innovative mechanical design, sophisticated GUI, etc. to both mass volume manufacturers and new technology development laboratories. As business partners, AEM supports its customers in developmental programs and strives for excellence in program execution. The high density modular test (HDMT) handler platform gained wide acceptance with its key customers in 2017. In line with the growth of the HDMT sales orders, the company reported significantly higher revenue for the ESS business.

2. **Precision component solutions**: AEM has the ability to deliver a broad range of customized precision engineering solutions with metals as well as plastics. The company designs, develops and manufactures precision engineering products used in electronics, life science, instrumentation and aerospace industries.

ACQUISITIONS

AEM has embarked on a growth path to diversify its revenue stream. The company acquired InspiRain in September 2017 and in March 2018, the company completed the acquisition of 100% stake in Afore Oy and the 100% stake in IRIS. After the purchasing, AEM merged the new companies in the ESS business which provides several growth synergies, such as the following:

1. **Test and measurement solutions through InspiRain**
   InspiRain engages in the business of test solutions such as portable network cable tester and vector network analyzer. For the network cable tester, AEM provides the TestPro 100, a high-performance and versatile field cable tester for installers and IT managers. By testing and validating cabling links for 2.5G, 5G and 10G Ethernet and PoE performance before deploying expensive equipment and services will enable corporations to achieve significant time and cost savings. AEM's mixed mode multi-port vector network analyzer (MMVNA 100) offers a ground-breaking solution to test data cabling. With the rapid growth in data transmission speeds, vector network analyzers are essential for characterizing the radio frequency (RF) transmission parameters of communications channels.

2. **MEMS testing solutions through Afore Oy**
   Afore Oy provides the world's only commercial wafer-level chip scale packaging MEMS tester. Its innovative MEMS solutions include wafer probes and test handlers with multi-stimulus and package options, as well as tri-temperature testing.

3. **Machine vision solutions through IRIS**
   Established in 2000, IRIS engages in the research, development and integration of advanced machine vision solutions to manufacturers in the electronics, semiconductor, medical, optical and MEMS devices manufacturing, robotics and logistics, precision parts and solar industries.

FUTURE PROSPECTS

The HDMT handler platform has been in high volume manufacturing since late 2016 and is expected to have continued sales driven by new platform launches as well as commissioning of new manufacturing sites by its key customer (Intel). To diversify its customer base, AEM has also secured a Memory manufacturer as a client for its handler platform solution.

The acquisition of InspiRain has started to yield results with the announced contract win to supply cable-testing solutions for Huawei's 5G rollout in China. AEM will provide test solutions developed in collaboration with Chinese research institute for qualifying high-performance short reach cabling links for Huawei's 5G backhaul network.

INVESTMENT THESIS

CONTINUOUS STRONG SALES BROUGHT BY HDMT UNITS

High Density Modular Test ("HDMT") is a testing mechanism used by AEM's key customer, Intel. It's key USP lies in the reduction of testing costs (by twice the customer's original target) over traditional testing mechanisms, and its ability to accommodate the rising complexity of chips.

Due to the 5G and market driven upgraded chips, Intel is seeing high demand for chip testing through sophisticated systems. HDMT provides breakthrough, low cost test technology for silicon validation and high-volume manufacturing. AEM spent a few years on this technology development and refining, and then successfully attracted customers due to lower unit testing cost and higher efficiency. Since its launch in 2017, it has become the main sales engine for AEM, and drives the expected 2019 revenue to be $310 million.

Although this testing mechanism was specifically designed for Intel, AEM has also launched AMPS (Asynchronous Modular Parallel Smart platform) (similar to HDMT solution) to target other chipmakers, not in direct competition with Intel. The market of HDMT products is likely to be impacted by the launch of additional chips designed to be using HDMT mechanisms, the expansion of chips manufacturing and the overall increase in chips demand. Continuous proven efficiency gains support the latter events.

After successful implementation of AEM's HDMT, the company has been offered to work on next-gen hybrid solutions with Intel. This new product is planning to ramp-up in 2020E, giving a promising outlook to AEM orders. AEM has assured this product would not cannibalize existing and potential HDMT revenues, as it is another technical solution. This fosters AEM's continuous close link with customers, as well as its capacity to provide diversified solutions.

INTEL'S STRATEGIC EXPANSION

Intel is AEM's largest customer (we estimated that Intel accounts for 94% of total revenue AEM generates), thus Intel's product line and manufacture ability has huge impact on AEM's sales.

Intel recently saw significant increase in demand for data centric driven processor business. They shifted their business focus to XPU compared to CPU (XPU is a term to include products that cater to the demand for data), and Intel estimates that by 2023, data centric processor sales will account for 70% of total its revenue. Additionally, the market will also expand to more than 4 times the current size of CPU industry. Data centric CPU are usually used in data center for big data processing and data saving. It will have high demand in the industry of 5G, autonomous driving and manufacturing, AI, and data memory for all the cloud services. Therefore, we expect that Intel's business will keep expanding fast in next 5 years, together with the back-end testing business with AEM.

AEM HOLDINGS (SGX: AWX)   **SINGAPORE BULLS, NATIONAL UNIVERSITY OF SINGAPORE**

Source: Intel's company report

In addition to this, Intel is investing significantly and trying to upgrade their processor products with stronger performance with upgraded node to 10nm and 7nm. Those products will be deployed into safety-critical industries, such as automotive, aircraft, medical equipment and smart home devices, which require more strict and harsher testing conditions to ensure the long-term stability of performance. Therefore, the demand for complex and high accuracy back-end testing will surge in the near future, while AEM's upgraded Asynchronous Modular Parallel Smart (AMPS) and MEMS platform can help to solve the issue. The expected revenue growth can be driven from this area.

ACQUISITION HELPS EXPAND PRODUCT LINE AND FUTURE COLLABORATION WITH HUAWEI

With sufficient cash on hand, AEM's expansion strategy lies in the acquisition of relatively smaller companies with strong technological and engineering know-how, able to leverage AEM's own production either vertically or horizontally in similar industries. This increases AEM's exposure.

In late 2017, AEM acquired InspiRain, a company focusing on radio frequency and advanced networking testing. After acquisition, InspiRain helped AEM extend the service and product line towards more 5G infrastructure testing raising together with processor testing. InspiRain has different testing segment to semiconductor back-end testing industry, it has small correlation to semiconductor supply and manufacture, therefore it can bring huge benefit to AEM in terms of diversification and reduce market risks. Furthermore, based on the AEM global presence and distribution channels, InspiRain service can extend further to China and other countries. In 2019, InspiRain started to deliver testing solutions to Huawei, the largest telecom equipment supplier in the world, and worked with Chinese state-owned research centre for co-authoring testing standard for 5G. This is a great opportunity for AEM enter China 5G market and create a close relationship with Huawei. AEM can therefore gradually diversify its customer portfolio and grow independently as well as following the global leading 5G trend.

In addition to InspiRain, the acquisition of Afore Oy and IRIS Solution in 2018 also expanded their testing solutions to have more variety and wider range. Microelectromechanical Systems ("MEMS") testing and handling solutions from Afore Oy see extraordinary market expansion of CAGR of 17.5% globally. IRIS is also helping AEM on R&D of advanced machine vision solutions, which is also a hot topic in surveillance and unmanned shopping experience in China and the US starting from 2019.

FINANCIAL ANALYSIS

REVENUE BREAK DOWN:

- Huge revenue jump in 2017 due to the launch of multi-year development effort on High Density Modular Test (HDMT) handler platform solution which helped the company gain large number of orders and drive revenue from S$70M to S$221M in one year.

- Revenue from China was the main driver of revenue growth in 2018. The revenue increased 470% in one year regardless of China-US trade war. The strong demand from customers in China is a reflection of the sustainable economy expansion and technology industry booming. However, we still can see that AEM is facing the decline of revenue in the USA in 2018.

| | 2018 | | 2017 | |
	Revenue $'000	Non-current assets $'000	Revenue $'000	Non-current assets $'000
Singapore	3,626	17,960	2,856	10,227
Finland	5,271	8,556	–	–
Malaysia	90,121	768	89,886	796
China	71,712	240	12,581	182
USA	37,518	8	51,026	–
Vietnam	51,457	–	57,316	–
Other countries	2,620	–	7,957	–
	262,325	27,532	221,622	11,205

Source: Annual Report 2018

PROFITABILITY

Operating and net margin has been stable, but increased slightly in last 3 years and climbed until 13% net margin. The increase in raw materials and other consumables cost in FY2018 was lower than the increase in revenue, mainly due to cost reduction initiatives. The return on equity changed in large amount in the last 5 years. Based on Dupont Model, financial leverage kept around 1.5-2.0 times, while asset turnover varies from 1.3 to 2.7 due to the faster growth of revenue as compared to assets. 2017 was an extraordinary year with strong sales of the new HDMT platform, increased net margin as well as asset turnover, touted as AEM's best performance in terms of profitability in its history. Earning per shares from last 5 years shows the strong performance of growing earning capability as it increased from -0.1 continuously to 0.12, and is expected to grow to 0.13 next year.

Operating and Net Margin

Dupont Analysis ROE
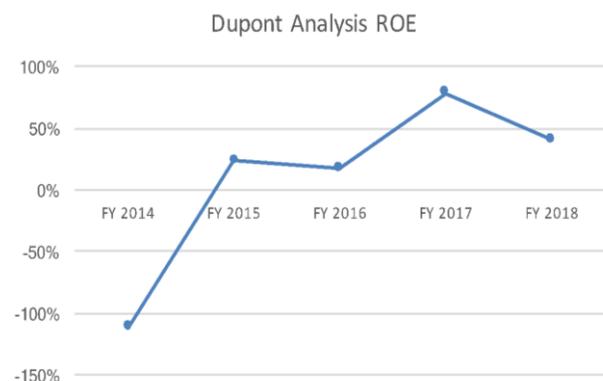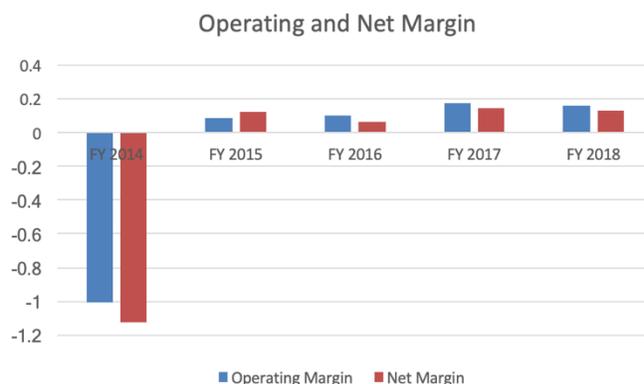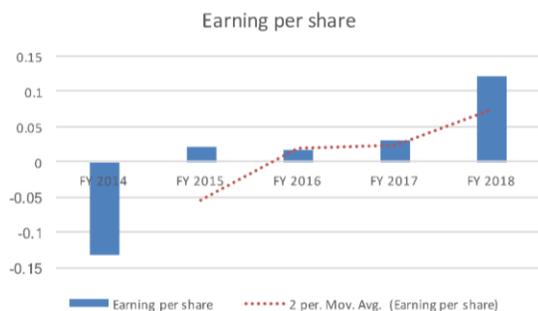
In terms of liquidity, due to the fast-increasing revenue and cashflows, debt is not high as compared to liquid assets. The current ratio stays around 1.5 to 2.5, quick ratio is above 1. Therefore, risk is particularly low, and the company can consider adding more leverage to the firm for expansion purposes.

VALUATION

Our target price is set to 3.04 SGD based on football field valuation on discounted cash flow method, P/E and P/S ratio multiples. We created analysis for worst and normal scenarios and decided to choose the DCF value as our target price, which also aligns with our multiples valuation.

DISCOUNTED CASH FLOWS VALUATION

Assumptions
- In the coming years, the annual growth rate for revenue will be 30%, 20%, 10% and remain at 5% until 2025
- EBIT margin will be 13% until 2025
- Depreciation & Amortization will initially be equal to the average from 2016 to 2018 then increase to SGD 1.50 million per year
- The change of working capital will be similar level of the past 5 years, which is calculated from the changes in CFO, Account Receivable and Payable relative to the revenue
- The capital expenditure will equal the average of the outflow of investments in the past 5 years, which will be 2.75 million per year
- The WACC, 7.65%, is calculated according to 1-year STI index return rate, 7.65%, and 1-year interest rate in Singapore, 1.75% (i.e Because the company's debt to equity ratio, 0.29%, is very low, the WACC of the company roughly equals to the required rate of return to equity investors investing in Singapore)
- The future long-term growth rate for the company will equal to the GDP growth rate in Singapore in2018, 3.80%
- The effective corporate income tax rate to the company will remain at 17%

Projections

According to the assumptions above, we project AEM's revenue, EBIT and FCFF from 2019 to 2025.

In Millions	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	TV
Revenue	310.00	403.00	483.60	531.96	558.56	586.49	615.81	646.60
EBIT	40.30	52.39	62.87	69.15	72.61	76.24	80.06	84.06
Tax rate @17%	1.13	1.24	1.37	1.37	1.37	1.37	1.37	1.50
Change in Working Capital	12.72	27.11	20.69	31.89	23.32	34.65	26.22	37.70
CAPEX	-2.75	-2.75	-2.75	-2.75	-2.75	-2.75	-2.75	-2.75
FCFF	24.61	20.36	35.61	29.62	41.07	32.75	44.35	36.33

We discounted the future cash flows to today and summarized then get the total equity value of the company as SGD 819.62 million. Based on this valuation, the target price of AEM ranges from 1.71 (in the worst case scenario) to 3.04 (in normal scenario)

Period	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	TV
PV	18.92	30.73	23.74	30.58	22.65	28.49	943.02
Enterprise Value	760.99						
Financial Debt	0.25						
Cash	58.89						
Equity Value	819.62						

MULTIPLES VALUATION

We found 9 comparable companies for AEM in the global market and calculated the metrics of these samples. All these samples are in the same industry with AEM according to Global Industry Classification Standard (GICS), while all of them are public companies.

From the comparison, we find the P/E and P/S ratios of AEM are lower than the comparables' average, while P/B ratio and dividend yield are higher.

Company	P/E	P/B	P/S	Dividend Yield
AEM	10.90	4.14	1.61	2.45%
GUDENG PRECISION INDUSTRIAL	39.10	5.89	4.40	0.20%
JUSUNG ENGINEERING CO LTD	8.80	1.57	1.30	1.40%
WONIK QNC CORP	68.00	1.76	1.30	0
UNITEST INC	14.80	2.11	1.50	2.70%
HANA MATERIALS INC	9.40	2.87	1.90	1.40%
KC TECH CO LTD/NEW	10.40	1.48	1.40	1.40%
CAMTEK LTD	17.40	3.18	3.00	0.00%
MI TECHNOVATION BHD	26.10	3.41	8.00	0.80%
UMS HOLDINGS LTD	13.70	1.90	3.90	4.20%
Comparables' Average	23.08	2.69	2.97	1.34%

Source: Bloomberg

In terms of cash flows, AEM's Cash flow/Net Income ratio is lower than the average, while the CFO/Sales ratio is slightly higher. However, AEM has desirable performance in its profitability as AEM's ROA and ROE are dramatically higher than the average.

Company	CF/NI	CFO/Sales	ROA	ROE
GUDENG PRECISION INDUSTRIAL	1.00	1.20%	5.60%	15.70%
JUSUNG ENGINEERING CO LTD	-0.70	-11.30%	10.30%	18.30%
WONIK QNC CORP	0.60	9.70%	1.10%	2.60%
UNITEST INC	1.20	22.80%	10.50%	14.80%
HANA MATERIALS INC	1.20	25.20%	18.90%	35.30%
KC TECH CO LTD/NEW	1.00	15.80%	12.70%	15.20%
CAMTEK LTD	0.90	13.60%	16.70%	21.80%
MI TECHNOVATION BHD	0.30	9.30%	11.60%	13.60%
UMS HOLDINGS LTD	0.90	29.90%	11.30%	14.10%
Comparables' Average	0.71	12.91%	10.97%	16.82%

Source: Bloomberg

In the analysis of liquidity and operation ratios, we observe that AEM has higher leverage than its competitors in the industry, but the receivable and inventory turnovers are better.

Company	Current Ratio	Debt/Assets	A/R Turnover	Inv Turnover
AEM	2.49	18.98%	14.26	5.25
GUDENG PRECISION INDUSTRIAL	2.00	52.50%	10.40	2.80
JUSUNG ENGINEERING CO LTD	2.20	16.70%	12.80	2.20
WONIK QNC CORP	1.20	23.30%	11.60	4.20
UNITEST INC	4.20	7.30%	5.30	3.30
HANA MATERIALS INC	0.50	40.20%	16.50	5.70
KC TECH CO LTD/NEW	3.80	0.00%	4.30	8.30
5CAMTEK LTD	3.10	0.00%	4.60	2.50
MI TECHNOVATION BHD	7.80	1.80%	1.70	1.80
UMS HOLDINGS LTD	2.70	7.40%	5.80	0.90
Comparables' Average	3.06	16.58%	8.11	3.52

Source: Bloomberg

We used the average numbers of the comparable companies as multiples to calculate AEM's valuation. Additionally, we regard AEM as a profitable company with sustainable operation. Thus, we used P/E ratio and P/S ratio to calculate the valuation for AEM. The estimated market value of AEM is from 919.67 to 941.57 million. The target price of AEM under this valuation ranges from 1.32 (with the lowest multiple) to 3.46 (with the average of multiples).

	EPS		SPS
AEM	0.15		1.14
Multiple	23.08		2.97
Price Per Share	3.46		3.38
Total Value	941.57		919.67

KEY RISKS

Despite the positive outlook for the company, we believe that it faces the following risks which might affect its stock performance:

OVER 90% OF AEM'S SALES IS STILL DERIVED FROM ITS KEY CUSTOMER.

Despite recent diversification efforts including 3 main acquisitions, AEM's performance is still dependent on the big order wins to maintain the revenue. Additionally, a delay of the key customer in the technology node rollout would lead to bad effects to AEM. In the long run, the key customer would eventually have a sufficient number of upgraded test handlers, which will heavily reduce the sales count for AEM.

THE COLLABORATION WITH HUAWEI MAY HAVE NEGATIVE IMPACTS ON THE RELATIONSHIP BETWEEN AEM AND ITS KEY CUSTOMER.

To diversify its customers, AEM was selected by Huawei for the testing and development of Huawei's 5G backhaul network in collaboration with a Chinese state-owned research institute. Following the ongoing trade war between China and the US, it will be a challenge for AEM to balance relations among its key customer (Intel), the new potential customer (Huawei) and governments.

THE FUTURE GROWTH SYNERGIES PROVIDED BY THE ACQUISITIONS ARE UNCERTAIN.

By purchasing other companies, AEM expected to expand its technical capabilities, realize the synergistic value and growth its business to the next level. On the other hand, it's always easier to expand to new sectors while it's hard to organically integrate the resources of these newly acquired companies. How to generate synergy benefit for the company is still a problem for AEM.