

AAC Technologies Holdings

Version 1 | Bloomberg: 2018 HK Equity | Reuters: 2018.HK

Refer to important disclosures at the end of this report

DBS Group Research . Equity

15 Jun 2018

BUY (Initiate coverage)

Last Traded Price (14 Jun 2018):HK\$119.40 (HSI : 30,440)

Price Target 12-mth: HK\$165 (38% upside)

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Price Relative



Forecasts and Valuation

FY Dec (RMB m)	2017A	2018F	2019F	2020F
Turnover	21,119	25,225	31,978	39,121
EBITDA	7,467	8,784	11,272	14,087
Pre-tax Profit	5,996	7,005	9,125	11,486
Net Profit	5,325	6,220	8,103	10,200
Net Pft (Pre Ex) (core profit)	5,325	6,220	8,103	10,200
EPS (RMB)	4.35	5.08	6.61	8.33
EPS (HK\$)	5.33	6.23	8.11	10.21
Core EPS (HK\$)	5.33	6.23	8.11	10.21
Core EPS (RMB)	4.35	5.08	6.61	8.33
EPS Gth (%)	32.6	16.8	30.3	25.9
Core EPS Gth (%)	32.6	16.8	30.3	25.9
Diluted EPS (HK\$)	5.33	6.23	8.11	10.21
DPS (HK\$)	2.16	2.52	3.28	4.13
BV Per Share (HK\$)	17.61	20.97	25.06	30.32
PE (X)	22.4	19.2	14.7	11.7
Core PE (X)	22.4	19.2	14.7	11.7
P/Cash Flow (X)	20.3	15.9	13.3	10.5
P/Free CF (X)	224.3	39.2	33.1	26.0
EV/EBITDA (X)	16.3	13.8	10.8	8.7
Net Div Yield (%)	1.8	2.1	2.7	3.5
P/Book Value (X)	6.8	5.7	4.8	3.9
Net Debt/Equity (X)	0.1	0.1	0.1	0.1
ROAE (%)	33.5	32.4	35.3	37.0

Earnings Rev (%)		New	New	New
Consensus EPS (RMB)		5.23	6.47	7.63
Other Broker Recs:		B:30	S:1	H:6

ICB Industry: Industrials

ICB Sector: Electronic & Electrical Equipment

Principal Business: The world's leading supplier of comprehensive smartphone components

Source of all data on this page: Company, DBSV, Thomson Reuters, HKEX

Thriving on clearer sound, better feel and sharper view

- The world's leading smartphone component supplier
- Beneficiary of continuous acoustics and haptics upgrades
- Expanding to optics with proprietary WLG technology
- Initiate coverage with BUY with TP of HK\$165

The world's leading smartphone component supplier. AAC is the world's leading smartphone component supplier, with c.30% and c.40% share in acoustics and haptics markets respectively. Riding on continuous upgrading cycle in acoustics, haptics, and optics (vs market concerns over slower spec upgrades), we expect AAC's net profit to deliver a CAGR of 24% in FY17-20F (vs consensus' 20%). AAC is trading at 14x FY19F PE, which is attractive compared to its historical trading band of 12-25x since FY14.

Where we differ. Beneficiary of continuous acoustics and haptics upgrades. The market is concerned about weaker-than-expected shipment of higher-spec iPhone X vs lower-spec iPhone 8/ 8 Plus slowing down spec upgrades. However, in our view, Apple will continue to differentiate with innovation in long run and lead spec upgrades (i.e. acoustics, haptics and optics upgrades to pave way for augmented reality [AR] applications, which is expected to come in 2019F). We believe AAC, as a technology leader, will continue to benefit from this trend. We expect AAC's net profit to deliver a CAGR of 24% in FY17-20F, higher than consensus' 20%.

Other critical factors. Expanding to optics with proprietary WLG technology. AAC's earnings has been growing with continuous expansion from acoustics to haptics & RF mechanical. Optics will be next to bloom. AAC stands out in high-end (i.e. 3D-sensing and hybrid) lens set market, as its proprietary wafer-level glass (WLG) has higher scalability and temperature tolerance vs peers' moulding or wafer-level optics (WLO). We expect AAC's optics revenue to ramp up to Rmb3,698m and account for 10% of FY20F revenue.

Valuation:

We initiate coverage on AAC with a BUY call, and our TP of HK\$165 is based on 20x FY19F PE.

Key Risks to Our View:

Slow acoustics and haptics upgrades, due to late launch of meaningful applications (i.e. AR); failure to tap into optics.

At A Glance

Issued Capital (m shrs)	1,222
Mkt Cap (HK\$/US\$m)	145,907 / 18,589
Major Shareholders (%)	
Benjamin Pan & family	40.5
JP Morgan Chase	13.9
The Capital Group	12.0
Free Float (%)	33.6
3m Avg. Daily Val. (US\$m)	122.3
ICB Industry: Industrials / Electronic & Electrical Equipment	

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SWOT Analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> • Innovation capability to acquire best-selling mobile phone vendors as clients in different mobile phone generation: AAC has innovation capability in providing smartphone components/ solutions which can deliver interesting user experience. AAC has been acquiring best-selling mobile phone vendors as clients in different mobile phone generation, from Motorola, Nokia, Apple to China's smartphone vendors. • Possessing key technology in dynamics and haptics components to be the world's number one in respective industries. AAC possesses key electromagnetic technology in dynamics components (i.e. speakers and receivers) and haptics components. With key technology, AAC is currently the world's largest supplier of smartphone speakers/receiver and haptic components. AAC is integrating its key technology with acquired company's (i.e. WiSpry and Kaleido) MEMS die design technology in MEMS microphones and RF mechanical and proprietary WLG technology in optics components. AAC aims to be the world's largest supplier of these components. 	<ul style="list-style-type: none"> • Limited track record in integrating its key technology with acquired technology in MEMS microphones, RF mechanical and optics components: AAC has successfully expanded its leading positions in dynamics components to haptics components, with its key electromagnetic technology. However, AAC lacks track record of integrating its key technology with acquired company's (i.e. WiSpry and Kaleido) MEMS die design technology in MEMS microphones and RF mechanical and proprietary WLG technology in optics components. AAC is the world's second-largest supplier of MEMS microphones and newcomers of RF mechanical and optics components.
Opportunities	Threats
<ul style="list-style-type: none"> • Acoustics upgrades to stereo solution and receivers on full screens: We expect high-ASP stereo solution and receivers on full screens to continue to be upgraded in Apple's iPhone and be introduced progressively in China's smartphones, which drive AAC's acoustics ASP growth. • Haptics upgrades in both iPhone and China's smartphones. We expect the adoption of augmented reality (AR) in 2019 iPhone and full screens in China's smartphones to result in haptics upgrades, which drive AAC's growth in haptics shipments. • Well positioned in high-end (i.e. 3D-sensing and hybrid) lens set market, with proprietary WLG technology: AAC is well positioned in 3D-sensing and hybrid lens set market, as its proprietary wafer-level glass (WLG) has higher scalability and temperature tolerance versus competitors' moulding or wafer-level optics (WLO). We expect AAC's market share in lens sets to grow from 1% in FY17 to 11% in FY20F. 	<ul style="list-style-type: none"> • Slowdown in smartphone shipments: Global smartphone shipments may drop, if the replacement cycle is further prolonged. • Slow stereo acoustics, haptics, and 3D-sensing upgrade: Smartphones may not migrate to stereo acoustics, haptics, and 3D-sensing, due to late launch of meaningful applications (i.e. augmented reality [AR]) and high costs. • Competition from newcomers: Merry's and Alps' entrance into Apple's supply chain may intensify competition in the dynamics component and haptics markets respectively. • Failure to tap into optics: AAC's proprietary WLG may not be widely adopted, due to technology issues.

Source: DBS Vickers

Industry overview

Global smartphone market. Global smartphone shipments rose 1.4% y-o-y to 1.49bn units in 2017, with a lower replacement rate (as buyers await iPhone X) but more first-time buyers, according to IDC. We expect shipments to grow 0.9% to 1.50bn units in 2018F, supporting by more replacement buyers given smartphone subscriber base of >4bn and recovering replacement rate.

Global smartphone market

	2016	2017	2018F	2019F	2020F
Smartphone subscriber base	3,840	4,410	4,841	5,154	5,343
Penetration rate	52.7%	59.8%	64.9%	68.3%	70.0%
First-time buyers	440	570	431	312	189
Replacement	1,030	920	1,072	1,194	1,288
Replacement rate	30.3%	24.0%	24.3%	24.7%	25.0%
Total	1,470	1,490	1,503	1,506	1,478
y-o-y	2.8%	1.4%	0.9%	0.2%	-1.9%

Source: Ericsson, IDC, DBS Vickers

Global smartphone vendors. Samsung's (005930 KS) and Apple's (AAPL US) shipments rose 1.9% and 0.2% in 2017. The shipments of China's top four smartphone vendors (Huawei, Oppo, Vivo, and Xiaomi) in aggregate climbed 30.7% in 2017, gaining share from smaller vendors (i.e. ZTE, TCL, and Meizu).

We expect Samsung's shipment to decline 1.2% in 2018F amid collective pressure from Chinese players and Apple, whose shipment will grow 2.1%, driven by iPhone 8/X and upcoming models. Huawei's and Xiaomi's smartphone shipments will continue to grow 16.0% and 21.5% in 2018F, due to their continuous share gain in both domestic and overseas markets. Oppo's and Vivo's smartphone shipments are expected to be flat, due to Huawei's expansion in the mid-to low-end market and Xiaomi's expansion in offline channels. Other smaller players will be continuously squeezed by intensifying competition.

Major smartphone vendors' global shipments

	2016	2017	2018F	2019F	2020F
Shipment (m)					
Samsung	311	317	314	308	296
Apple	215	216	220	223	222
Huawei	133	150	174	199	221
Oppo	86	120	121	123	125
Vivo	72	100	100	102	104
Xiaomi	61	90	109	128	146

y-o-y	2016	2017	2018F	2019F	2020F
Samsung	1.9%	-1.2%	-1.9%	-4.0%	
Apple	0.2%	2.1%	1.4%	-0.7%	
Huawei	12.8%	16.0%	14.3%	11.0%	
Oppo	39.5%	0.7%	1.6%	1.7%	
Vivo	38.9%	0.2%	1.3%	2.0%	
Xiaomi	47.5%	21.5%	17.5%	13.8%	

Source: IDC, DBS Vickers

Smartphone component opportunities. We believe Apple's iPhone will continue to undergo upgrades in acoustics, haptics and cameras, to have better sound (stereo), feel (3D touch), image (multi cameras) and sensing (3D sensing). We expect Android smartphones to follow suit. This will benefit related component suppliers via increased volumes and/or ASPs.

Trend #1: Acoustic upgrades to stereo solution and receivers on full screens. Stereo acoustics solution enables sound to travel in different directions for a more realistic audio experience. Following Apple's iPhone 7 upgrading to stereo sound in 2016 and iPhone 8/X further upgrading in 2017, China's smartphones (i.e. Huawei's P10 plus, and Vivo's X20) started to adopt stereo sound in 2017.

We expect stereo acoustics solution's penetration for smartphones to increase from 16.6% in 2017 to 44.0% in 2020F. We forecast shipments of smartphones with stereo acoustics solution to rise from 247m in 2017 to 650m units in 2020F, delivering a 38.0% CAGR during 2017-2020F. As stereo acoustics solution's ASP is c.2x of mono acoustics solution's, the former will bring upside to acoustics' blended ASP.

Besides, iPhone X's full screens with notch design in 2017 reduced the space for receivers at the top portion of smartphones, and hence required smaller receivers. Future iPhone are expected to be with small notches or even without notches (receiver hole may no longer be placed at the front of the smartphones) and the latter need to have their receivers placed under the displays. Hence, the adoption of full-screen design without notches in future iPhone will lead to upgrades in receivers and thus higher acoustics dollar content.

AAC's dynamics components



Source: Company, DBS Vickers

Shipments of smartphones with stereo acoustics solution

	2016	2017	2018F	2019F	2020F
Global smartphone shipment (m)					
Apple	215	216	220	223	222
Android - non China	634	666	656	630	578
Android - China	621	608	627	653	678
Total	1,470	1,490	1,503	1,506	1,478

Stereo acoustic solution penetration rate

Apple	37.5%	85.0%	88.3%	91.7%	95.0%
Android - non China	0.0%	5.0%	10.0%	25.0%	35.0%
Android - China	0.0%	5.0%	10.0%	25.0%	35.0%
Total	5.5%	16.6%	21.5%	34.9%	44.0%

Smartphone shipment in stereo acoustic solution (m)

Apple	81	183	195	205	211
Android - non China	0	33	66	157	202
Android - China	0	30	63	163	237
Total	81	247	323	525	650
y-o-y			30.6%	62.7%	23.8%

Source: IDC, DBS Vickers

Trend #2: Haptics upgrades in both iPhone and China's smartphones. Haptics with 3D Force Touch functions, which allows users to feel 3D touch on screen by applying force feedback (i.e. left & right and up & down vibration) on users' hands, were first introduced in iPhone 6s in 2015. Android smartphones did not follow suit without meaningful applications then. However, iPhone X's full screens will lead to physical 'home' buttons being replaced by haptic-based virtual buttons. This time round, China's smartphones (i.e. Huawei's

P20, Oppo's R15, Vivo's X21) have been starting to adopt full-screen designs and haptic-based virtual buttons in 2018F.

We expect the adoption of haptics solution in smartphones to increase from 12.3% in 2017 to 44.0% in 2020F. We forecast the shipment of smartphones with haptics to rise from 183m in 2017 to 650m in 2020F, delivering a 52.5% CAGR during 2017-2020F.

Besides, it is expected 2019 iPhone will come with rear-facing 3D sensing, to perform augmented reality (AR, overlaying digital imagery onto the real world) applications. Hence, the adoption of AR in future iPhone will lead to upgrades in haptics to enhance AR user experience and thus higher haptics dollar content.

Example of China's smartphones adopting full-screen designs and haptic-based virtual buttons in 2018F



Source: DBS Vickers

Shipments of smartphones with haptics

	2016	2017	2018F	2019F	2020F
Global smartphone shipment (m)					
Apple	215	216	220	223	222
Android - non China	634	666	656	630	578
Android - China	621	608	627	653	678
Total	1,470	1,490	1,503	1,506	1,478

Haptics penetration rate

Apple	77.5%	85.0%	88.3%	91.7%	95.0%
Android - non China	0.0%	0.0%	10.0%	25.0%	35.0%
Android - China	0.0%	0.0%	10.0%	25.0%	35.0%
Total	11.4%	12.3%	21.5%	34.9%	44.0%

Smartphone shipment in haptics (m)

Apple	167	183	195	205	211
Android - non China	0	0	66	157	202
Android - China	0	0	63	163	237
Total	167	183	323	525	650
y-o-y		9.9%	76.0%	62.7%	23.8%

Source: IDC, DBS Vickers

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Trend #3: Camera migration to dual/ multi cameras. Adopting dual/ multi cameras allow smartphone cameras to deliver image quality close to level of digital single-lens reflex (DSLR) cameras. There are currently mainly three type of multi-cameras: (1) large + small dual cameras for facilitating focus, (2) mono + color dual cameras for enhancing image details, and (3) wide + telephoto dual cameras for achieving optical zoom effect.

Major types of dual cameras

Type	Functions	Adopted smartphones
Large + small dual cameras	A higher-resolution camera + a lower-resolution camera (i.e. 13MP +5MP)	The additional lower resolution camera can be used to collect depth data, facilitating fast focus and refocus functions, but the lower-resolution camera cannot enhance the picture image quality.
Mono + color dual cameras	Two high resolution cameras (i.e. 13MP + 13MP). One has a colour image sensor and the other has a black-white (mono) image sensor.	The colour camera collects the color data of the image, while the mono camera enhances the brightness and details of the image.
Optical zoom dual cam (wide + telephoto)	Two high resolution cameras. One has a wide view angle and the other has a narrow view angle (telephoto).	Two different fields of view cameras work together to achieve the optical zoom effect.

Source: DBS Vickers

Following Apple's iPhone 7 Plus in 2016, China's smartphones and Samsung have been adopting dual/ multi cameras since 2016 and 2017 respectively. We expect dual/ multi camera penetration for smartphones to further increase from 20.9% in 2017 to 56.8% in 2020F. We expect the shipment of smartphones with dual cameras to rise from 311m in 2017 to 839m in 2020F, delivering 39.2% of CAGR during 2017-2020F.

Shipments of smartphones with dual/ multi cameras

	2016	2017	2018F	2019F	2020F
Global smartphone shipment (m)					
Apple	215	216	220	223	222
Android - non China	634	666	656	630	578
Android - China	621	608	627	653	678
Total	1,470	1,490	1,503	1,506	1,478

Dual/ multi camera penetration rate

Apple	37.5%	85.0%	88.3%	91.7%	95.0%
Android - non China	5.0%	10.0%	25.0%	35.0%	50.0%
Android - China	5.0%	10.0%	25.0%	35.0%	50.0%
Total	9.8%	20.9%	34.3%	43.4%	56.8%

Smartphone shipment in dual/ multi camera (m)

Apple	81	183	195	205	211
Android - non China	32	67	164	220	289
Android - China	31	61	157	228	339
Total	144	311	515	654	839
y-o-y		726.9%	726.9%	54.1%	37.6%

Source: IDC, DBS Vickers

Trend #4: Camera migration to 3D sensing. Apple's iPhone X had migrated to 3D sensing in 2017, for facial recognition replacing fingerprint recognition. Samsung (i.e. Galaxy S9) and China's smartphones (i.e. Huawei's P20, Oppo's R15, Vivo's X21) have been starting to follow suit in 2018F. There will be potentially more functions for 3D sensing, such as augmented reality (AR, overlaying digital imagery onto the real world), which is expected to be adopted by Apple's iPhone in 2019F.

We expect 3D-sensing penetration for smartphones to increase from 2.2% in 2017 to 38.4% in 2020F. We forecast the shipment of smartphones with 3D sensing to rise from 32m in 2017 to 568m in 2020F, delivering a 159.8% CAGR during 2017-2020F.

Shipments of smartphones with 3D-sensing

	2016	2017	2018F	2019F	2020F
Global smartphone shipment (m)					
Apple	215	216	220	223	222
Android - non China	634	666	656	630	578
Android - China	621	608	627	653	678
Total	1,470	1,490	1,503	1,506	1,478

3D sensing penetration rate

Apple	15.0%	77.5%	85.0%	88.3%
Android - non China	0.0%	10.0%	25.0%	35.0%
Android - China	0.0%	5.0%	10.0%	25.0%
Total	2.2%	17.8%	27.4%	38.4%

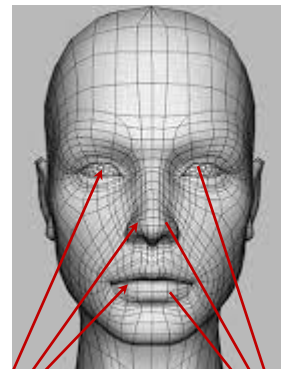
Smartphone shipment in 3D-sensing (m)

Apple	32	171	190	196
Android - non China	-	66	157	202
Android - China	-	31	65	169
Total	32	268	413	568
y-o-y		726.9%	54.1%	37.6%

Source: IDC, DBS Vickers

The main components of 3D-sensing camera modules include infrared radiation transmitters (IR Tx, i.e. vertical cavity surface emitting laser [VCSEL, which emits optical beams] and lens sets) and IR receiver cameras (IR Rx, i.e. lens sets and CMOS image sensors). ASP of lens set in IR Tx and IR Rx will be at least that of high-resolution (i.e. 13MP/16MP) lens sets. Smartphones' adoption of 3D sensing will further drive up their optics dollar content.

3D-sensing camera modules



Infrared radiation transmitters (IR Tx)

- IR Tx projects an infrared dot pattern onto the object
- Modules include vertical cavity surface emitting laser (VCSEL, which emits optical beams) and lens sets

IR receiver cameras (IR Rx)

- IR Rx captures it and measures the size of the dots (Structured light) or the time it takes to return (Time-of-Flight [ToF]) to estimate the distance
- Modules include lens sets and CMOS image sensors

Source: IDBS Vickers

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Company overview

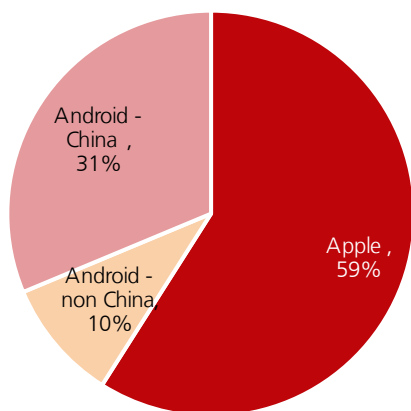
Company background. Established in 1993 and listed in 2005, AAC is the world's leading supplier of smartphone components. The company started with from dynamics components (i.e. speakers and receivers) and expanded into new verticals, including MEMS microphones, haptics & RF mechanical, to other products (i.e. optics). Its major customers include Apple, Samsung, and China's smartphone vendors (i.e. Huawei, Oppo, Vivo, and Xiaomi).

AAC's milestones

1993	The company was founded
1998	The company began shipping to Motorola
2000	Mass production of receivers
2002	Mass production of multi-function devices, speakers and ECM microphones
2005	Listed on Hong Kong Stock Exchange Qualified by Sony Ericsson
2007	Mass production of MEMS microphones Qualified by Nokia
2010	Automated production for speakers The company began shipping to Apple's iPhone
2011	The company began shipping to Samsung
2014	Mass production of haptics & RF mechanical
2017	Mass production of lens sets

Source: Company, DBS Vickers

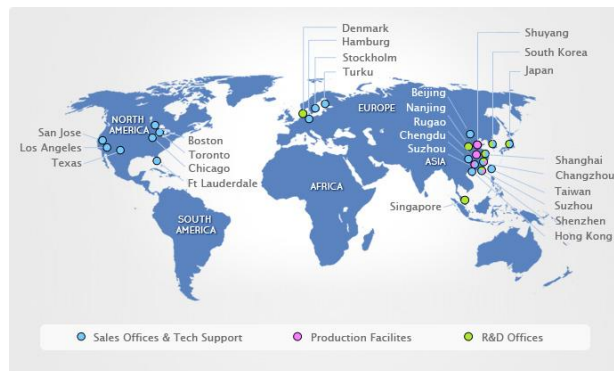
AAC's customer mix



Source: Company, DBS Vickers

AAC has four major production facilities, including Changzhou (acoustics and haptics production), Shuyang (acoustics production), Shenzhen (microphone production), and Suzhou (optics production).

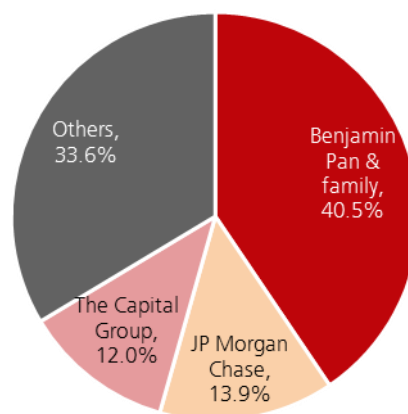
AAC's major sales & tech support, production facilities, and R&D offices



Source: Company, DBS Vickers

Benjamin Pan, Chief Executive Officer, is founder of the company. Benjamin is responsible for developing and implementing the company's strategic objectives and business plans. He is also leading the research and development strategy. Ingrid Wu, his spouse, is co-founder and Non-executive Director of the company. They are substantial shareholder of the company, who hold 40.5% stake in the company. BoonHwee Koh is Chairman of the company. He is also chairman of Sunningdale Tech and serves on the board of Agilent Technologies. He was previously chairman of DBS Group, Singapore Telecom Group; managing director of Hewlett Packard Singapore; director of Temasek.

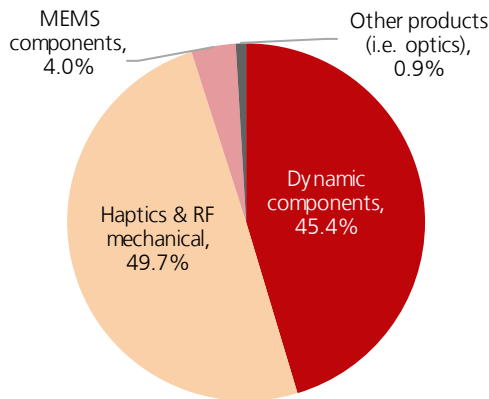
AAC's shareholder structure



Source: Company, DBS Vickers

Product mix. Dynamics components (i.e. speakers and receivers), MEMS microphones, haptics & RF mechanical, and other products (i.e. optics) accounted for 45.4%, 4.0%, 49.7%, and 0.9% of its FY17 revenue respectively.

AAC's FY17 revenue mix



Source: Company, DBS Vickers

Dynamics components (45.4% of FY17 revenue): AAC is the world's largest speaker/receiver supplier, with c.30% global market share, followed by GoerTek (002241 CH) and Merry (2439 TT). AAC's competitive advantage is its leading technology with a comprehensive patent portfolio.

AAC's dynamics components



Source: DBS Vickers

Comparison of leading acoustics component suppliers

	AAC (2018 HK)	GoerTek (002241 CH)	Merry (2439 TT)
Acoustic FY17 revenue (Rmb m)	10,427	15,266	3,043
Acoustic products	Speakers, receivers, MEMS microphones	Speakers, receivers, MEMS microphones, headsets	Speakers, receivers, headsets
Acoustic FY17 gross profit margin	~40%	~25%	~15%
Market share in iPhone	~45%	~45%	~10%
Apple exposure	~50%	~20%	~20%
Other acoustic customers	Samsung, China's smartphone vendors	Samsung, China's smartphone vendors	China's smartphone vendors

Source: DBS Vickers

iPhone's speaker/receiver order allocation

	AAC (2018 HK)	GoerTek (002241 CH)	Knowles (KN US)	Merry (2439 TT)
iPhone 6	30-40%	60%	<10%	
iPhone 6s	30-40%	60%	<10%	
iPhone 7	50%	40%	0%	10%
iPhone 8	30-40%	30-40%	0%	10-20%
iPhone X	60%	40%	0%	0%

Source: Company, DBS Vickers

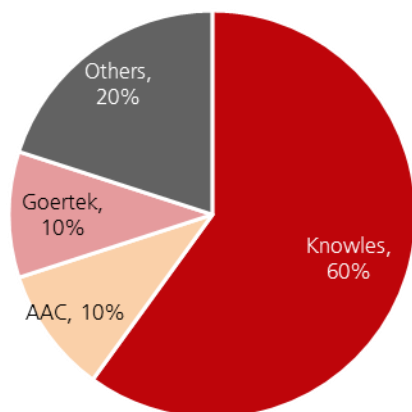
Goertek, which used to focus on microphones, has emerged as the second largest speaker/receiver supplier following its aggressive capacity expansion. AAC usually gets more order allocation for Apple's (AAPL US) iPhone with major acoustics upgrade (i.e. iPhone 7 and X), while GoerTek gets more order allocation for iPhone with minor acoustics upgrade (i.e. iPhone 6, 6s and 8).

Merry is a global leader in wireless headphones. It is expanding into the iPhone's speakerbox supply, through forming joint venture with Luxshare (equity structure 49%/51% between Merry and Luxshare). With the funding from Luxshare, Merry Suzhou expanded acoustic capacity by more than 3x in 2017 and will expand another 30% by 1H18. We believe Merry is less likely to secure a meaningful order allocation for iPhone with major acoustics upgrade, but should compete with AAC and GoerTek to supply for iPhone with minor acoustics upgrade.

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MEMS microphones (4.0% of FY17 revenue). AAC is the world's second largest supplier of MEMS microphones, with c.10% global market share, after Knowles (KN US, c.60%).

MEMS microphone market share



Source: Company, DBS Vickers

Knowles, the largest supplier, controls the product roadmap in upgrading product cycle better than AAC, as Knowles designs its own MEMS dies, while AAC uses "off-the-shelf" MEMS dies from Infineon.

However, AAC has acquired MEMS dies' intellectual property (IP) portfolio from an established industry player in 2017. The company expects 10% of its MEMS microphones (mostly mid-to-low end MEMS microphones for China' smartphone vendors) with its own MEMS dies to be shipped in FY18F. With key technologies, AAC aims to be the world's largest supplier in MEMS microphones.

Haptics (34.7% of FY17 revenue). AAC is the world's largest haptics supplier, with c.40% global market share, followed by Nidec (6594 JT, c.30%) and Alps (6770 JT, c.20%).

iPhone's haptics order allocation

	AAC (2018 HK)	Jinlong (300032 CH)	Nidec (6594 JT)	Alps (6770 JT)
iPhone 6	60-65%	20-25%	10-20%	
iPhone 6s	40-50%	10%	40-50%	
iPhone 7	50-60%	0%	40-50%	
iPhone 8	40%	0%	60%	20%
iPhone X	100%	0%	0%	0%

Source: DBS Vickers

AAC's leading technology has enabled the company to obtain more order allocation for iPhones with major haptics upgrade (i.e. iPhone 7 and X), while Nidec gets more order allocation for iPhone with minor acoustics upgrade (i.e. iPhone 8). Alps is a new supplier with little order allocation, after Jinlong (300032 CH) was excluded from iPhone's supply chain.

Radio frequency (RF) mechanical (13.3% of FY17 revenue).

AAC is an integrated radio frequency (RF) and casing supplier, mainly for China's smartphone vendors. While FIH (2038 HK) and BYDE (285 HK) have scale advantage and receive more casing order from Huawei including those for its high-end models, AAC's competitive advantage is its RF and casing solutions integrated with leading RF MEMS technology.

AAC has acquired WiSpry in 2015, a fabless RF semiconductor company in the US which develops RF MEMS technology for tunable (software-controllable) antenna. Tunable antenna can overcome the challenges posed by the increasing antenna count in 5G smartphones for the spectrum within wider frequency ranges. Therefore, AAC's RF mechanical business will present opportunity when 5G comes.

China smartphone vendors' order allocation for casings

	FIH (2038 HK)	BYDE (285 HK)	Tongda (698 HK)	Everwin (300115 CH)	AAC (2018 HK)
Huawei	✓✓	✓✓	✓	✓	✓
Oppo	✓	✓	✓✓	✓	✓
Vivo	✓✓	✓	✓	✓✓	✓
Xiaomi	✓✓	✓	✓✓	✓✓	✓✓

✓✓ - major source, ✓ - second source

Source: DBS Vickers

Others (i.e. optics, 0.9% of FY17 revenue). AAC began its optics business by investing in Kaleido in 2010. After years of development, AAC can now supply plastic and its proprietary wafer-level glass (WLG, glass lenses manufactured by semiconductor wafer processes) lens sets. Current customers are Samsung and China's smartphone vendors.

While Largan (3008 TT), and Sunny Optical (2382 HK), which are the world's largest and second largest handset lens set suppliers, have scale advantages, AAC has capability to supply lens sets made of different materials (i.e. plastic and its proprietary WLG). AAC's proprietary WLG lenses are well positioned in 3D-sensing and hybrid lens sets.

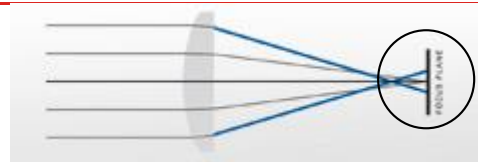
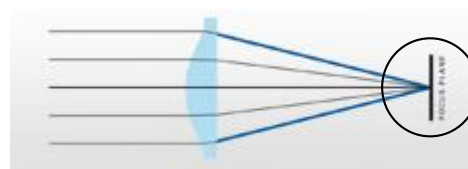
Len set suppliers' capacities (units)

	Plastic	Glass	Hybrid
Largan	150m/month	Limited (Moulding)	Limited
Sunny Optical	70m/month	Limited (Moulding)	Limited
AAC	30m/month	5-10m/month (WLG)	5-10m/month

Source: DBS Vickers

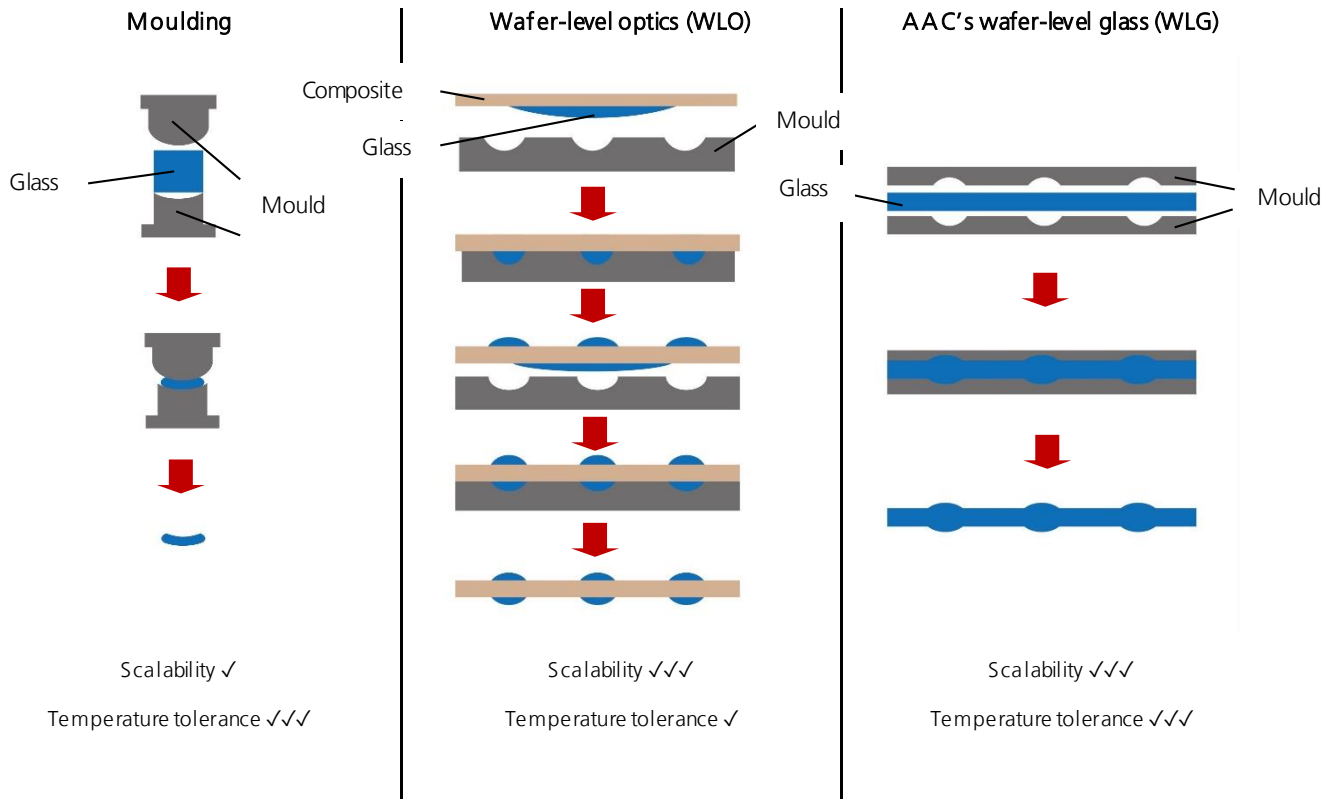
- (1) Wafer-level glass (WLG): We expect AAC's WLG to be adopted in infrared radiation transmitters' (IR Tx) lens sets in 3D-sensing camera modules. It is because wafer-level glass (WLG) has higher scalability and temperature tolerance versus competitors' moulding or wafer-level optics (WLO). We expect AAC to gain market share in lens sets for IR Tx, which is dominated by AMS's (AMS AW) Heptagon and Himax (HIMX US).
- (2) Hybrid lens sets: AAC is working on hybrid lens sets (i.e. plastic lens + glass lens based on its WLG). As glass lenses have advantages of better refraction rate versus plastic lenses, glass lenses can achieve better optical performance (i.e. in terms of higher pixels and optical zoom), under the same height of lens sets. For example, a 5P1G lens set (5 plastic lenses + 1 glass lens, total 6

lenses) will achieve better performance than a 6P lens set (6 plastic lenses) and similar performance of a 7P lens set (7 plastic lenses). Therefore, using glass lenses can help the lens set upgrade beyond 7P (7 plastic lenses), as 8P/9P (8/9 plastic lenses) may not be possible under the thickness constraint of smartphones. We expect hybrid lens sets to start replacing plastic lens sets on high-end smartphones.

Glass lenses have advantages of better refraction rate versus plastic lenses**Plastic lens****Glass lens**

Source: ARRI Rental, DBS Vickers

Comparison of moulding, wafer-level optics (WLO) and AAC's wafer-level glass (WLG)



Source: DBS Vickers

Growth driver

Growth driver 1: Acoustics upgrades to stereo solution and receivers on full screens. Following Apple's iPhone 7 upgrading to stereo sound in 2016 and iPhone 8/X further upgrading in 2017, China's smartphones (i.e. Huawei's P10 plus, and Vivo's X20) started to adopt stereo sound in 2017.

We expect AAC's stereo acoustics solution (i.e. receiverbox [bundling of the receiver with speakerbox] at the top of smartphones + stereo speakerbox at the bottom of smartphones) as a percentage of dynamics component shipment volume to rise from 22.5% in FY17F to 45.4% in FY20F.

Besides, iPhone X's full screens with notch design in 2017 reduced the space for receivers at the top portion of smartphones, and hence required smaller receivers. Future iPhone are expected to be with small notches or even without notches (receiver hole may no longer be placed at the front of the smartphones) and the latter need to have their receivers placed under the displays. Hence, the adoption of full-screen design without notches in future iPhone will lead to upgrades in receivers and thus higher acoustics dollar content.

As ASP of stereo acoustics solution with receivers on full screen is c.2x of that of mono acoustics solution's, we expect dynamics component ASP to deliver CAGR of 11.0% over FY17-20F. We expect AAC's dynamics component revenue to deliver a CAGR of 16.3% in FY17-20F.

Growth driver 2: Haptics upgrades in both iPhone and China's smartphones. 3DForce Touch functions with haptics, which can vibrate in left-right or up-down direction, were first introduced in iPhone 6s in 2015. Android smartphones did not follow suit with meaningful applications then. However, iPhone X's full screens have led to physical 'home' buttons being replaced by haptic-based virtual buttons. This time round, China's smartphones (i.e. Huawei's P20, Oppo's R15, Vivo's X21) have been starting to adopt full-screen designs and haptic-based virtual buttons in 2018F.

Besides, it is expected 2019 iPhone will come with rear-facing 3D sensing module, to perform augmented reality (AR) applications. Hence, the adoption of AR in future iPhone will lead to upgrades in haptics to enhance AR user experience and thus higher haptics dollar content.

We forecast AAC's haptics to deliver shipment volume CAGR of 28.0% over FY17-20F. We expect AAC's haptics & RF mechanical revenue to deliver an FY17-20F CAGR of 21.7%.

Growth driver 3: Well positioned in hybrid and 3D-sensing lens sets market, with proprietary WLG technology. AAC has capability to supply lens sets made of different materials (i.e. plastic and its proprietary WLG). AAC's proprietary WLG lenses are well positioned in hybrid and 3D-sensing lens sets.

- (1) Plastic lens sets: AAC is expanding its monthly capacity for plastic lens sets from 20m units in FY17 to 30m units in 1H18. AAC's price is 10-20% lower than Largan's. Current customers are Samsung and China's smartphone vendors. We expect AAC's plastic lens set shipment volume to grow from 40m units in FY17 to 255m units in FY20F, delivering an FY17-20F CAGR of 85.5%.
- (2) Hybrid lens sets: AAC will expand its monthly capacity for hybrid lens sets (i.e. plastic lens + glass lens based on its WLG) to 3-5m units in 1H18 and 5-10m units in 2H18. As glass lenses have advantages of better refraction rate versus plastic lenses, glass lenses can achieve better optical performance under the same height. We expect hybrid lens sets to start replacing plastic lens sets on high-end smartphones. We expect AAC's hybrid lens set shipment to ramp up from 20m units in FY18F to 85m units in FY20F, contributing 20% of FY20F lens set sales volume.
- (3) Wafer-level glass (WLG): AAC will expand its monthly capacity for wafer-level glass (WLG) lens sets to 3-5m units in 1H18 and 5-10m units in 2H18. We expect AAC's WLG to be adopted in infrared radiation transmitters' (IR Tx) lens sets in 3D-sensing camera modules, as they have higher scalability and temperature tolerance versus competitors' moulding or wafer-level optics (WLO). We expect AAC to gain market share in lens sets for IR Tx, which is dominated by AMS's (AMS AW) Heptagon and Himax (HIMX US). We expect AAC's WLG shipment to ramp up from 20m units in FY18F to 85m units in FY20F, contributing 20% of FY20F lens set sales volume.

We expect AAC's lens set shipment volume to grow from 40m units in FY17 to 426m units in FY20F, delivering an FY17-20F CAGR of 120.0%. We forecast AAC's optics revenue to increase to Rmb3,698m in FY20F, contributing 9.5% of FY20F total revenue.

AAC Technologies Holdings

Financial forecast

Revenue. We forecast revenue to grow by 19.4% in FY18F and 26.8% in FY19F respectively:

- **Dynamics components (i.e. speakers and receivers):** We expect AAC's dynamics component revenue to increase 15.9% in FY18F and 19.9% in FY19F. We forecast AAC's dynamics component shipments to increase 5.4% in FY18F and 5.1% in FY19F, based on global smartphone shipment forecasts. We also expect dynamics component ASP to increase 10.0% in FY18F and 14.1% in FY19F, with stereo speaker and receiverbox solution as a percentage of speakerbox and receiver solution's shipment to rise from 22.5% in FY17 to 26.0% in FY18F and 37.6% in FY19F.

Dynamics component (i.e. speakers and receivers) revenue

	FY16	FY17	FY18F	FY19F	FY20F
Shipment (m)					
Speaker	174	167	139	65	-
Speakerbox	191	176	206	241	278
Stereo speaker solution	40	100	121	185	231
Receiver	365	343	346	306	278
Receiverbox	40	100	121	185	231
Total	810	886	934	982	1,019
y-o-y		9.4%	5.4%	5.1%	3.7%

ASP (Rmb)

Speaker	6.2	5.6	5.2	4.9	4.8
Speakerbox	12.5	11.2	10.4	9.9	9.6
Stereo speaker solution	25.0	23.6	26.4	23.8	22.8
Receiver	4.7	4.2	3.9	3.7	3.6
Receiverbox	29.6	27.8	30.3	27.5	26.4
Total	9.8	10.8	11.9	13.6	14.8
y-o-y		10.1%	10.0%	14.1%	9.1%

Revenue (Rmb m)

Speaker	1,085	937	723	322	-
Speakerbox	2,382	1,982	2,143	2,378	2,674
Stereo speaker solution	1,008	2,352	3,210	4,400	5,279
Receiver	1,707	1,446	1,346	1,133	1,003
Receiverbox	1,197	2,772	3,683	5,084	6,114
Total	7,956	9,580	11,106	13,318	15,070
y-o-y		20.4%	15.9%	19.9%	13.2%

Source: Company, DBS Vickers

- **MEMS microphones:** We forecast AAC's MEMS microphone revenue to increase 19.0% in FY18F and 18.9% in FY19F. AAC's MEMS microphone shipments are expected to increase 25.5% in FY18F and 25.2% in FY19F, based on global smartphone shipment forecasts. We expect MEMS microphone ASP to decline 7.5% in FY18F and 5.0% in FY19F, in the absence of major microphone upgrades.

MEMS microphone (i.e. speakers and receivers) revenue

	FY16	FY17	FY18F	FY19F	FY20F
Shipment (m)	482	557	699	875	1,080
y-o-y		15.6%	25.5%	25.2%	23.4%
ASP (Rmb)	1.1	1.6	1.4	1.4	1.3
y-o-y		42.9%	-7.5%	-5.0%	-2.5%
Revenue (Rmb m)	535	848	1,009	1,199	1,443
y-o-y		58.3%	19.0%	18.9%	20.3%

Source: Company, DBS Vickers

- **Haptics & RF mechanical:** We expect AAC's haptics & RF mechanical revenue to increase 11.7% in FY18F and 28.8% in FY19F, mainly driven by haptics revenue growth. Meanwhile, AAC's haptics shipments are seen to increase 20.5% in FY18F and 43.0% in FY19F, due to increasing haptics adoption in China's smartphones. We expect haptics ASP to decline 18.2% in FY18F and 14.4% in FY19F, due to low ASP of haptics for China's smartphones.

Haptics & RF mechanical revenue

	FY16	FY17	FY18F	FY19F	FY20F
Shipment (m)					
Haptics	92	117	142	202	246
y-o-y		27.9%	20.5%	43.0%	21.7%
RF	10	20	35	51	68
y-o-y		100.0%	73.3%	46.2%	33.8%
Total	102	137	176	253	314
y-o-y		35.0%	28.2%	43.6%	24.2%

ASP (Rmb)

Haptics	56	62	51	44	44
y-o-y		11.1%	-18.2%	-14.4%	-0.2%
RF	156	140	130	123	120
y-o-y		-10.0%	-7.5%	-5.0%	-2.5%
Total	68.2	76.4	66.6	59.7	60.2
y-o-y		12.1%	-12.9%	-10.4%	0.9%

Revenue (Rmb m)

Haptics	5,156	7,325	7,228	8,848	10,754
y-o-y		42.1%	-1.3%	22.4%	21.5%
RF	1,784	2,808	4,500	6,252	8,156
y-o-y		57.4%	60.3%	38.9%	30.5%
Total	6,940	10,496	11,728	15,099	18,910
y-o-y		51.2%	11.7%	28.8%	25.2%

Source: Company, DBS Vickers

- **Other products (i.e. optics):** We expect AAC's optics revenue to increase 691.1% in FY18F and 70.9% in FY19F. We also expect AAC's optics shipment to increase 400.3% in FY18F and 52.0% in FY19F, driven by increasing share in China's smartphone market from 2.5% in FY17 to 10.0% in FY18F and 15.0% in FY19F. We forecast optics ASP to increase 58.1% in FY18F and 12.4% in FY19F, due to increasing lens set shipments from high pixel (i.e. 10/13/16MP), hybrid (i.e. glass lens based on its WLG + plastic lens) and WLG lens sets.

Optics revenue

	FY16	FY17	FY18F	FY19F	FY20F
Shipment (m)					
Haptics		40	200	304	426
y-o-y			400.3%	52.0%	40.0%
ASP (Rmb)		4.4	6.9	7.8	8.7
y-o-y			58.1%	12.4%	11.8%
Revenue (Rmb m)		175	1,382	2,362	3,698
y-o-y			691.1%	70.9%	56.6%

Source: Company, DBS Vickers

Gross profit margin. We expect gross profit margin (GPM) to dragged from 41.3% in FY17 to 40.4% in FY18F, by Rmb appreciation, but rebound to 40.5% in FY19F, with improving optics GPM with better production yield on larger scale.

Operating expense. We expect operating expense as a percentage of revenue to decrease from 5.9% in FY16 to 5.6% in FY18F and 5.2% in FY19F, on operating leverage.

Net profit. We expect AAC's net profit to rise 16.8% in FY18F and 30.3% in FY19F.

Key assumptions

	FY16	FY17	FY18F	FY19F	FY20F
Revenue (Rmb m)					
Dynamic components	7,956	9,580	11,106	13,318	15,070
Haptics & RF mechanical	6,940	10,496	11,728	15,099	18,910
MEMS components	535	848	1,009	1,199	1,443
Other products	75	196	1,382	2,362	3,698
Total	15,507	21,119	25,225	31,978	39,121

Growth

Dynamic components	29.3%	20.4%	15.9%	19.9%	13.2%
Haptics & RF mechanical	56.3%	51.2%	11.7%	28.8%	25.2%
MEMS components	-45.9%	58.3%	19.0%	18.9%	20.3%
Other products	-51.3%	159.5%	606.0%	70.9%	56.6%
Total	32.1%	36.2%	19.4%	26.8%	22.3%

GPM

Dynamic components	45.5%	40.8%	40.5%	40.3%	40.0%
Haptics & RF mechanical	40.1%	43.6%	42.4%	41.2%	40.0%
MEMS components	8.8%	22.4%	28.3%	34.1%	40.0%
Other products	-12.5%	22.3%	31.5%	40.8%	50.0%
Total	41.5%	41.3%	40.4%	40.5%	40.9%

Source: Company, DBS Vickers

AAC Technologies Holdings

Scenario analysis. Apple and China's smartphone vendors accounted for 59.0% and 31.3% of AAC's FY17 revenue.

Based on our base case analysis, assuming iPhone shipment and China's smartphone shipment to grow 2.1% and 3.1% respectively in 2018F, we forecast AAC's FY18F net profit to grow 16.8% y-o-y to Rmb6,220m.

However, many investors were concerned about Apple and China's smartphone growth. We did a scenario analysis assuming Apple's iPhone shipment and China's smartphone shipment to deliver higher or lower grow rate. In our bear case scenario, assuming iPhone shipment or China's smartphone shipment to decline 10.0% in 2018F, AAC's FY18F net profit will grow 8.2% y-o-y to Rmb5,764m or 11.4% y-o-y to Rmb5,934m respectively, which will be 7.3% or 4.6% lower than our base case forecast. So risk on iPhone and China's smartphone shipment slowdown is manageable.

Scenario analysis: AAC's net profit sensitivity to Apple's iPhone shipment and China's smartphone shipment

	2018 growth				
Apple's iPhone shipment	-10.0%	-5.0%	0.0%	5.0%	10.0%
AAC's net profit	8.2%	11.8%	15.3%	18.9%	22.4%
China's smartphone shipment	-10.0%	-5.0%	0.0%	5.0%	10.0%
AAC's net profit	11.4%	13.5%	15.5%	17.6%	19.6%

Source: Company, DBS Vickers

Valuation & recommendation

As per our estimates, AAC is currently trading at 19x/14x FY18F/19F PE, which is lower than the historical average.

We initiate coverage on AAC with a BUY call, and a target price of HK\$165, based on 20x FY19F PE, which is one standard deviation above the historical average. The valuation is justified

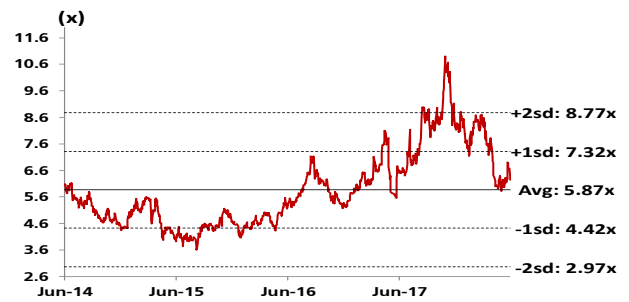
by its FY17-20F net profit CAGR of 24% with continuous acoustics and haptics upgrade cycle, and increasing horizontal integration of optics with proprietary WLG lens sets, which is well positioned within the hybrid and 3D-sensing lens set markets.

PE chart



Source: Thomson Reuters, DBS Vickers

PB chart



AAC Technologies Holdings

AAC's share price



We believe AAC's share price is related to its clients' (Apple, Samsung, and China smartphone vendors) major spec upgrades (i.e. acoustics or haptics). We can observe some general trends of this relationship from the chart above.

2012: Samsung started to adopt speakerboxes, though Apple's iPhone 5 had no major acoustics upgrade. AAC's share price rose 55%.

2013: Samsung accelerated speakerbox adoption, though Apple's iPhone 5s had no major acoustics upgrade. AAC's share price rose 39%.

2014: Neither Apple's iPhone 6 nor Samsung had major acoustics upgrade. AAC's share price rose only 10%.

2015: China smartphones started to adopt speakerboxes. Apple's iPhone 6s had no major acoustics upgrade but haptics was upgraded to 3D Force Touch functions. AAC's share price rose 22%.

2016: China smartphones accelerated speakerbox adoption. Apple's iPhone 7 was upgraded to stereo sound and there were further upgrades to haptics (iPhone 7 replaced mechanical 'home' buttons by static 'home' buttons [circular touch area with haptics to provide illusion that users are pressing buttons]). AAC's share price increased 39%.

2017: Apple's iPhone 8/X further upgraded stereo sound (moving toward mini-HiFi) and haptics (iPhone X replaced physical 'home' buttons with haptic-based virtual buttons). AAC's share price rose 98%.

2018 YTD: China smartphones started to adopt stereo sound and haptics. But the market is concerned about weaker-than-expected shipment of Apple's higher-spec iPhone X (OLED) vs lower-spec iPhone 8/ 8 Plus (LCD) slowing down acoustics and haptics upgrades. AAC's share price dropped c.20%.

Source: Thomson Reuters, DBS Vickers

Peer valuations

Company Name	Code	Currency	Target		Mkt		PE			P/Bk			ROE		
			Price	Price	Cap	Fiscal	17A	18F	19F	17A	18F	19F	17A	18F	19F
			Local\$	Local\$	Local\$m	Yr	x	x	x	x	x	x	%	%	%
Goertek 'A'	002241 CH	CNY	11.35	n.a.	36,832	Dec	16.7	15.3	13.0	2.5	2.2	1.9	16.9	15.6	15.4
Mery Electronics	2439 TT	TWD	153	n.a.	30,717	Dec	8.1	16.5	11.5	2.2	2.8	2.5	35.1	15.2	22.9
Knowles	KN US	USD	15.93	n.a.	1,433	Dec	16.7	18.0	15.4	1.3	5.8	n.a.	6.4	4.8	5.8
Nidec#	6594 JT	JPY	17205	n.a.	5,129,533	Mar	45.7	31.8	27.6	6.0	4.7	4.2	13.9	16.1	16.3
Alps Electric#	6770 JT	JPY	2775	n.a.	550,027	Mar	15.6	12.1	10.8	2.1	1.6	1.4	14.5	14.4	14.4
Amphenol 'A'	APH US	USD	91.2	n.a.	27,491	Dec	27.5	25.9	23.5	7.0	7.1	5.9	17.0	27.0	28.2
Byd Electronic (Intl.)	285 HK	HKD	12.06	n.a.	27,174	Dec	9.1	8.7	7.4	1.6	1.4	1.2	19.8	16.7	16.6
Tongda Group Holdings*	698 HK	HKD	1.86	2.50	11,256	Dec	11.1	8.3	6.4	1.9	1.7	1.5	19.2	21.4	24.2
Shenzhen Everwin Precn. Tech.'A'^	300115 CH	CNY	13.6	n.a.	12,363	Dec	n.a.	n.a.	n.a.	n.a.	2.4	2.0	13.6	14.7	17.0
Largan Precision	3008 TT	TWD	4620	n.a.	619,727	Dec	23.9	24.6	19.4	6.7	5.7	4.8	30.7	25.6	27.2
Sunny Optical Tech.(Gp.)	2382 HK	HKD	165.7	n.a.	181,773	Dec	52.5	37.5	27.5	20.5	14.3	10.1	46.9	43.8	42.2
Genius Electronic Optc.	3406 TT	TWD	530	n.a.	52,879	Dec	50.5	n.a.	n.a.	7.2	n.a.	n.a.	15.4	n.a.	n.a.
Q Technology (Group)*	1478 HK	HKD	6.92	6.60	7,832	Dec	14.2	21.7	15.6	2.9	2.6	2.3	23.5	12.7	15.8
Arms	AMS SW	CHF	89.92	n.a.	7,591	Dec	68.5	28.3	13.5	7.6	5.6	4.3	11.9	25.0	39.3
Himax Techs.Adr 1:2	HIMX US	USD	8.75	n.a.	1,506	Dec	54.0	150.9	36.9	3.3	3.3	2.8	6.1	3.7	18.4

For acoustics, GoerTek (002241 CH), Merry (2439 TT) and Knowles (KN US) are trading at 12-15x FY19F PE. GoerTek and Merry have lost market share to AAC for iPhone's acoustics upgrades, while Knowles has no major microphone upgrade.

For haptics, Nidec (6594 JT), as the world's the world's largest comprehensive motor manufacturer and second largest haptics supplier, is trading at 27x FY19F PE. But it is not a good benchmark, as haptics only accounted for a single-digit percentage of its FY17 revenue.

For optics, Largan (3008 TT) is trading at 18x FY19F PE, while Sunny Optical (2382 HK) are trading at 29x. This is because Largan has lost high-end orders from China's smartphone vendors to Sunny Optical. AMS (AMS SW), a sensor developer which acquired Heptagon (the world's largest 3D-sensing lens set suppliers for 3D-sensing camera modules' infrared radiation transmitters), is trading at 14x FY19 PE. Himax (HIMX US), another 3D-sensing lens set supplier for 3D-sensing camera modules' infrared radiation transmitters, is trading at 28x FY19F PE. The market is positive on its 3D-sensing lens sets' potential to expand from iPhones to Android-based smartphones.

FY18: FY19; FY19: FY20

^ Core EPS

Source: Thomson Reuters, *DBS Vickers

AAC Technologies Holdings

CRITICAL FACTORS TO WATCH

Critical Factors

Dynamics component ASP

Dynamics components accounted for 45% of FY17 revenue. We expect high-ASP stereo solutions and receivers on full screens to continue to be upgraded in Apple’s iPhone and be introduced progressively in China’s smartphones, which drive AAC’s acoustics ASP growth.

We forecast AAC’s dynamics component revenue to deliver FY17-20F CAGR of 16%.

- (1) We expect AAC’s dynamics component shipment to deliver FY17-20F CAGR of 5%, based on global smartphone shipment forecasts.
- (2) As ASP of stereo acoustics solution with receivers on full screens is c.2x of mono acoustics solution’s, the former will bring upside to the blended ASP for acoustics. We expect dynamics component ASP to deliver an FY17-20F CAGR of 11%.

Haptics shipments

Dynamics & RF components accounted for 50% of FY17 revenue. We expect the adoption of augmented reality (AR) in 2019 iPhone and full screens in China’s smartphones to result in haptics upgrades, which drive AAC’s growth in haptics shipments.

We forecast AAC’s haptics & RF revenue to deliver FY17-20F CAGR of 22%, mainly driven by haptics revenue growth.

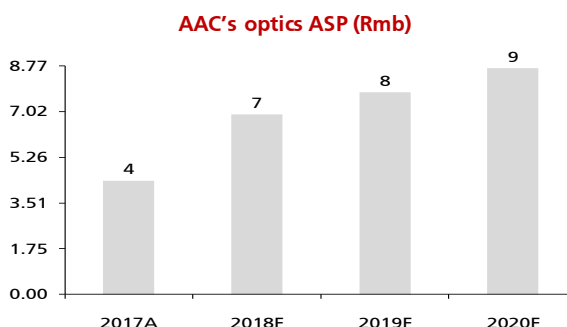
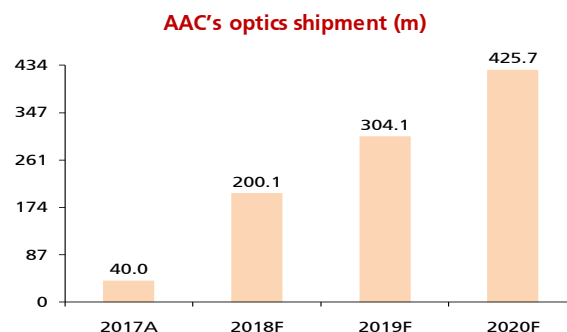
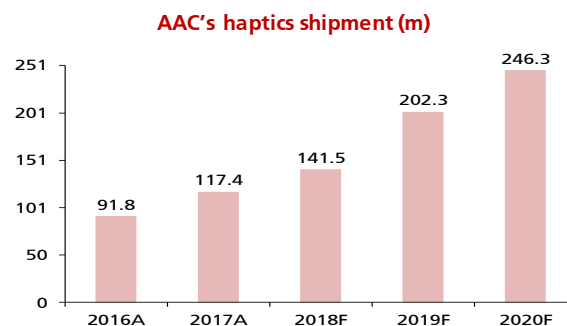
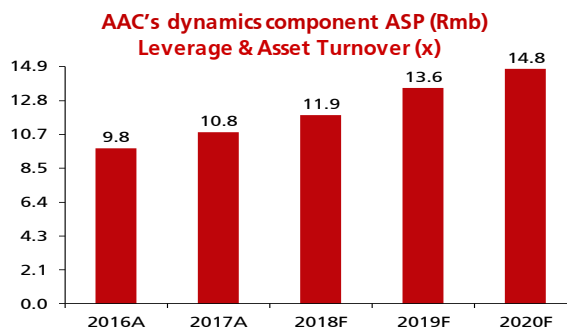
- (1) AAC’s haptics shipment to deliver FY17-20F CAGR of 28%, due to increasing adoption of haptics in China’s smartphones.
- (2) Haptics ASP to post FY17-20F CAGR of -11%, due to the low ASP for haptics used in China’s smartphones.

Optics shipment and ASP

Optics accounted for 1% of FY17 revenue, emerging as a new growth driver. AAC is well positioned in 3D-sensing and hybrid lens set market, as its proprietary wafer-level glass (WLG) has higher scalability and temperature tolerance versus competitors’ moulding or wafer-level optics (WLO). We expect AAC’s market share in lens sets to grow from 1% in FY17 to 12% in FY20F.

We expect AAC’s other product revenue to deliver FY17-20F CAGR of 177%.

- (1) AAC’s optics shipment to deliver FY17-20F CAGR of 120%, driven by increasing share in China’s smartphone market from 3% in FY17 to 20% in FY20F.
- (2) Optics ASP to post FY17-20F CAGR of 26%, due to increasing lens set shipment from high pixel (i.e. 10/13/16MP), hybrid (i.e. glass lens based on its WLG + plastic lens) and WLG lens sets.



Source: Company, DBS Vickers

Balance Sheet:

Net debt position. As of December 2017, AAC had a net debt position of Rmb2,247m (Rmb6,290m debt and Rmb4,043m cash). Its net capex was Rmb5,328m in FY17, with Rmb5,859m in operating cash inflows. Supported by free cash inflows, AAC has a stable dividend payout of c.40%. Management expects capex to be Rmb4,500m in FY18F (40-50%/20%/5%/20-25% for optics, acoustics, haptics, and infrastructure).

Share Price Drivers:

Acoustics upgrades to stereo solution and receivers on full screens: We expect high-ASP stereo solutions and receivers on full screens to continue to be upgraded in Apple's iPhone and be introduced progressively in China's smartphones, which drive AAC's acoustics ASP growth.

Haptics upgrades in both iPhone and China's smartphones: We expect the adoption of augmented reality (AR) in 2019 iPhone and full screens in China's smartphones to result in haptics upgrades, which drive AAC's growth in haptics shipments.

Well positioned in high-end (i.e. 3D-sensing and hybrid) lens set market, with proprietary WLG technology: AAC is well positioned in 3D-sensing and hybrid lens set market, as wafer-level glass (WLG) has higher scalability and temperature tolerance versus competitors' moulding or wafer-level optics (WLO). We expect AAC's market share in lens sets to grow from 1% in FY17 to 11% in FY20F.

Key Risks:

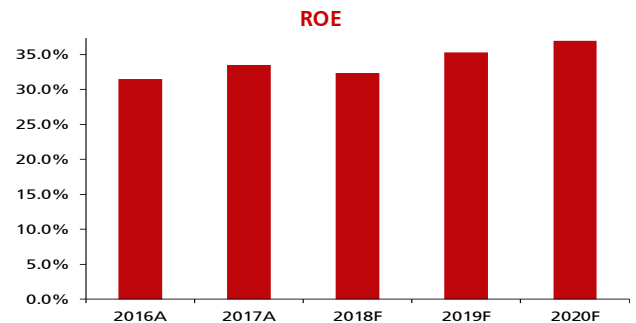
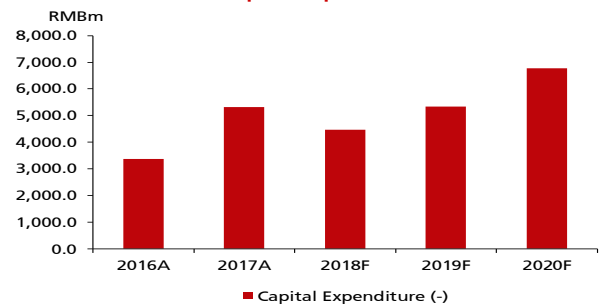
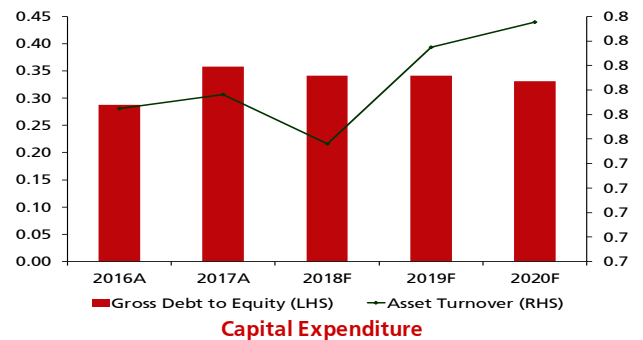
Slowdown in global smartphone shipments: Global smartphone penetration was high at 60% in 2017. Global smartphone shipments in 2018F/2019F may drop, if the replacement cycle is further prolonged (24% of replacement rate in 2017).

Slow upgrading in acoustics, haptics, and cameras: Smartphone makers may not migrate to stereo acoustics, haptics, and 3D sensing, due to late launch of meaningful applications (i.e. augmented reality [AR]) and high costs.

Failure to tap into optics: AAC's proprietary WLG may not be widely adopted, due to technology issues.

Company Background:

Established in 1993 and listed in 2005, AAC Technologies Holdings (AAC) is the world's leading supplier of comprehensive smartphone components. The company has proven its ability to tap into new verticals, moving from dynamics components (i.e. speakers and receivers), MEMS microphones, haptics & RF, to optics, which accounted for 45%, 4%, 50%, and 1% of its FY17 revenue respectively.



Source: Company, DBS Vickers

AAC Technologies Holdings

Key Assumptions

FY Dec	2016A	2017A	2018F	2019F	2020F
AAC's dynamics component ASP (Rmb)	9.8	10.8	11.9	13.6	14.8
AAC's haptics shipment (m)	91.8	117.4	141.5	202.3	246.3
AAC's optics shipment (m)	-	40.0	200.1	304.1	425.7
AAC's optics ASP (Rmb)	-	4.4	6.9	7.8	8.7

Source: Company, DBS Vickers

Segmental Breakdown (RMB m)

FY Dec	2015A	2016A	2017A	2018F	2019F	2020F
Revenues (RMB m)						
Dynamic components	6,152	7,956	9,580	11,106	13,318	15,070
Haptics & RF mechanical	4,441	6,940	10,496	11,728	15,099	18,910
MEMS components	990	535	848	1,009	1,199	1,443
Other products	155	75	196	1,382	2,362	3,698
Total	11,739	15,507	21,119	25,225	31,978	39,121
Gross profit (RMB m)						
Dynamic components	2,466	3,619	3,908	4,501	5,362	6,028
Haptics & RF mechanical	2,255	2,786	4,578	4,974	6,222	7,564
MEMS components	185	47	190	285	410	577
Other products	(34)	(9)	44	435	962	1,849
Total	4,872	6,443	8,720	10,196	12,956	16,018
Gross profit Margins (%)						
Dynamic components	40.1	45.5	40.8	40.5	40.3	40.0
Haptics & RF mechanical	50.8	40.1	43.6	42.4	41.2	40.0
MEMS components	18.7	8.8	22.4	28.3	34.1	40.0
Other products	(22.0)	(12.5)	22.3	31.5	40.8	50.0
Total	41.5	41.5	41.3	40.4	40.5	40.9

Source: Company, DBS Vickers

Income Statement (RMB m)

FY Dec	2015A	2016A	2017A	2018F	2019F	2020F
Revenue	11,739	15,507	21,119	25,225	31,978	39,121
Cost of Goods Sold	(6,867)	(9,064)	(12,399)	(15,028)	(19,022)	(23,103)
Gross Profit	4,872	6,443	8,720	10,196	12,956	16,018
Other Opng (Exp)/Inc	(2,373)	(2,891)	(3,945)	(4,651)	(5,685)	(6,799)
Operating Profit	2,499	3,551	4,775	5,546	7,272	9,219
Other Non Opng (Exp)/Inc	963	1,157	1,393	1,663	2,109	2,580
Associates & JV Inc	(5)	(9)	(7)	(8)	(10)	(12)
Net Interest (Exp)/Inc	(22)	(67)	(165)	(196)	(245)	(300)
Dividend Income	0	0	0	0	0	0
Exceptional Gain/(Loss)	0	0	0	0	0	0
Pre-tax Profit	3,435	4,633	5,996	7,005	9,125	11,486
Tax	(325)	(609)	(671)	(784)	(1,021)	(1,286)
Minority Interest	(3)	1	(1)	(1)	(1)	(1)
Preference Dividend	0	0	0	0	0	0
Net Profit	3,107	4,026	5,325	6,220	8,103	10,200
Net Profit before Except.	3,107	4,026	5,325	6,220	8,103	10,200
EBITDA	4,168	5,662	7,467	8,784	11,272	14,087
Growth						
Revenue Gth (%)	32.2	32.1	36.2	19.4	26.8	22.3
EBITDA Gth (%)	33.6	35.8	31.9	17.6	28.3	25.0
Opg Profit Gth (%)	27.5	42.1	34.5	16.1	31.1	26.8
Net Profit Gth (%)	34.1	29.6	32.3	16.8	30.3	25.9
Margins & Ratio						
Gross Margins (%)	41.5	41.5	41.3	40.4	40.5	40.9
Opg Profit Margin (%)	21.3	22.9	22.6	22.0	22.7	23.6
Net Profit Margin (%)	26.5	26.0	25.2	24.7	25.3	26.1
ROAE (%)	30.3	31.5	33.5	32.4	35.3	37.0
ROA (%)	20.9	19.8	19.4	18.4	20.0	20.8
ROCE (%)	18.9	19.5	20.0	18.9	20.9	22.1
Div Payout Ratio (%)	40.2	38.9	40.3	40.3	40.3	40.3
Net Interest Cover (x)	113.8	53.2	29.0	28.3	29.7	30.7

Source: Company, DBS Vickers

AAC Technologies Holdings

Interim Income Statement (RMB m)

FY Dec	1H2015	2H2015	1H2016	2H2016	1H2017	2H2017
Revenue	4,707	7,032	5,564	9,943	8,644	12,474
Cost of Goods Sold	(2,753)	(4,113)	(3,274)	(5,790)	(5,103)	(7,296)
Gross Profit	1,953	2,919	2,289	4,153	3,541	5,179
Other Oper. (Exp)/Inc	(281)	(523)	(325)	(438)	(375)	(600)
Operating Profit	1,673	2,396	1,964	3,715	3,166	4,579
Other Non Opg (Exp)/Inc	83	169	64	131	75	11
Associates & JV Inc	(2)	(3)	(3)	(5)	(4)	(3)
Net Interest (Exp)/Inc	(8)	(14)	(20)	(47)	(68)	(97)
Exceptional Gain/(Loss)	0	0	0	0	0	0
Pre-tax Profit	1,762	2,570	2,029	3,818	3,193	4,515
Tax	(128)	(197)	(160)	(449)	(314)	(357)
Minority Interest	2	(6)	0	1	0	0
Net Profit	1,654	2,388	1,893	3,394	2,903	4,181
Net profit bef Except.	1,620	2,346	1,845	3,346	2,855	4,133

Growth

Revenue Gth (%)	26.7	36.2	18.2	41.4	55.4	25.5
Opg Profit Gth (%)	27.4	31.0	17.4	55.0	61.2	23.3
Net Profit Gth (%)	30.6	36.3	14.5	42.1	53.3	23.2

Margins

Gross Margins (%)	41.5	41.5	41.1	41.8	41.0	41.5
Opg Profit Margins (%)	35.5	34.1	35.3	37.4	36.6	36.7
Net Profit Margins (%)	35.1	34.0	34.0	34.1	33.6	33.5

Source: Company, DBS Vickers

Quarterly Income Statement (RMB m)

FY Dec	3Q2016	4Q2016	1Q2017	2Q2017	3Q2017	4Q2017
Revenue	4,207	5,737	4,215	4,429	5,324	7,151
Cost of Goods Sold	(2,448)	(3,342)	(2,461)	(2,642)	(3,124)	(4,171)
Gross Profit	1,759	2,394	1,754	1,787	2,199	2,979
Other Oper. (Exp)/Inc	(215)	(223)	(187)	(189)	(275)	(325)
Operating Profit	1,544	2,171	1,567	1,599	1,925	2,654
Other Non Opg (Exp)/Inc	74	57	29	46	32	(20)
Associates & JV Inc	(3)	(3)	(1)	(2)	(2)	(1)
Net Interest (Exp)/Inc	(19)	(28)	(32)	(36)	(44)	(53)
Exceptional Gain/(Loss)	0	0	0	0	0	0
Pre-tax Profit	1,608	2,210	1,575	1,619	1,922	2,592
Tax	(166)	(283)	(164)	(150)	761	(1,118)
Minority Interest	1	0	0	0	0	0
Net Profit	1,455	1,939	1,423	1,481	2,695	1,486
Net profit bef Except.	1,431	1,915	1,399	1,457	2,671	1,462
EBITDA	0	0	0	0	0	0
Growth (QoQ)						
Revenue Gth (%)	39.3	36.4	(26.5)	5.1	20.2	34.3
Opg Profit Gth (%)	41.8	40.6	(27.8)	2.0	20.4	37.9
Net Profit Gth (%)	42.2	33.2	(26.6)	4.1	82.0	(44.9)
Growth (YoY)						
Revenue Gth (%)	32.1	49.1	65.6	46.7	26.6	24.7
Opg Profit Gth (%)	44.2	63.8	78.9	46.9	24.7	22.3
Net Profit Gth (%)	15.0	72.8	63.6	44.6	85.2	(23.4)
Margins						
Gross Margins (%)	41.8	41.7	41.6	40.4	41.3	41.7
Opg Profit Margins (%)	36.7	37.8	37.2	36.1	36.2	37.1
Net Profit Margins (%)	34.6	33.8	33.8	33.4	50.6	20.8

Source: Company, DBS Vickers

AAC Technologies Holdings

Balance Sheet (RMB m)

FY Dec	2015A	2016A	2017A	2018F	2019F	2020F
Net Fixed Assets	7,080	9,494	13,526	16,426	19,873	24,351
Invts in Associates & JVs	6	14	0	0	0	0
Other LT Assets	1,154	1,920	2,589	2,578	2,571	2,565
Cash & ST Invts	2,224	3,975	4,043	5,049	5,997	7,078
Inventory	1,718	2,623	3,398	4,118	5,213	6,331
Debtors	4,196	6,156	7,155	8,546	10,834	13,254
Other Current Assets	43	75	11	11	11	11
Total Assets	16,420	24,257	30,722	36,729	44,500	53,589
ST Debt	1,159	3,304	4,349	5,195	6,586	8,057
Creditors	2,919	5,346	6,369	7,720	9,772	11,868
Other Current Liab	248	476	379	831	1,068	1,333
LT Debt	649	789	1,941	1,941	1,941	1,941
Other LT Liabilities	91	128	133	141	157	175
Shareholder's Equity	11,354	14,215	17,551	20,900	24,975	30,213
Minority Interests	0	0	0	1	2	3
Total Cap. & Liab.	16,420	24,257	30,722	36,729	44,500	53,589
Non-Cash Wkg. Capital	2,790	3,032	3,816	4,124	5,218	6,396
Net Cash/(Debt)	416	(117)	(2,247)	(2,087)	(2,529)	(2,920)
Debtors Turn (avg days)	125.1	121.8	115.0	113.6	110.6	112.4
Creditors Turn (avg days)	157.4	186.2	192.7	191.2	186.5	189.8
Inventory Turn (avg days)	88.5	97.8	99.1	102.0	99.5	101.3
Asset Turnover (x)	0.8	0.8	0.8	0.7	0.8	0.8
Current Ratio (x)	1.9	1.4	1.3	1.3	1.3	1.3
Quick Ratio (x)	1.5	1.1	1.0	1.0	1.0	1.0
Net Debt/Equity (X)	CASH	0.0	0.1	0.1	0.1	0.1
Net Debt/Equity ex MI (X)	0.0	0.0	0.1	0.1	0.1	0.1
Capex to Debt (%)	137.9	82.3	84.7	62.7	62.6	67.7
Z-Score (X)	30.0	0.0	0.0	0.0	0.0	0.0

Source: Company, DBS Vickers

Cash Flow Statement (RMB m)

FY Dec	2015A	2016A	2017A	2018F	2019F	2020F
Pre-Tax Profit	3,435	4,633	5,996	7,005	9,125	11,486
Dep. & Amort.	711	962	1,306	1,582	1,901	2,301
Tax Paid	(325)	(609)	(671)	(784)	(1,021)	(1,286)
Assoc. & JV Inc/(loss)	5	9	7	8	10	12
(Pft)/ Loss on disposal of FAs	0	0	0	0	0	0
Chg in Wkg.Cap.	(214)	(205)	(779)	(301)	(1,077)	(1,159)
Other Operating CF	0	0	0	0	0	0
Net Operating CF	3,613	4,790	5,859	7,511	8,938	11,354
Capital Exp.(net)	(2,493)	(3,367)	(5,328)	(4,472)	(5,341)	(6,771)
Other Invt.(net)	(101)	(26)	(486)	0	0	0
Invt in Assoc. & JV	5	(17)	8	(8)	(10)	(12)
Div from Assoc & JV	0	0	0	0	0	0
Other Investing CF	163	(749)	(193)	0	0	0
Net Investing CF	(2,426)	(4,159)	(6,000)	(4,480)	(5,351)	(6,784)
Div Paid	(1,249)	(1,564)	(2,148)	(2,510)	(3,269)	(4,115)
Chg in Gross Debt	379	2,285	2,197	846	1,391	1,471
Capital Issues	358	399	160	(361)	(760)	(846)
Other Financing CF	(57)	1	(1)	0	0	0
Net Financing CF	(569)	1,121	208	(2,025)	(2,638)	(3,490)
Currency Adjustments	0	0	0	0	0	0
Chg in Cash	617	1,752	68	1,006	949	1,081
Opg CFPS (RMB)	3.12	4.07	5.42	6.38	8.18	10.22
Free CFPS (RMB)	0.91	1.16	0.43	2.48	2.94	3.74

Source: Company, DBS Vickers

DBSVHK recommendations are based on Absolute Total Return* Rating system, defined as follows:

STRONG BUY (>20% total return over the next 3 months, with identifiable share price catalysts within this time frame)

BUY (>15% total return over the next 12 months for small caps, >10% for large caps)

HOLD (-10% to +15% total return over the next 12 months for small caps, -10% to +10% for large caps)

FULLY VALUED (negative total return i.e. > -10% over the next 12 months)

SELL (negative total return of > -20% over the next 3 months, with identifiable catalysts within this time frame)

Share price appreciation + dividends

Completed Date: 15 Jun 2018 10:18:30 (HKT)

Dissemination Date: 15 Jun 2018 14:23:26 (HKT)

Sources for all charts and tables are DBS Vickers unless otherwise specified.

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