

Equity Research | China | Technology

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Cutting-edge technologies keep coming

- Having been a global leader and major supplier of acoustic products to Apple Inc., AAC looks set to enjoy strong revenue growth on technology upgrades and rising penetration of high-end acoustics among Chinese smartphone vendors over the coming 2-3 years.
- In Haptics and RF, AAC's cutting-edge technologies allow it to further penetrate into the high-end procurement of leading Chinese smartphone vendors. In addition, the company looks well poised to become a game-changer in optics for use in AR and 3D sensing, in our view.
- Given rich valuation, we initiate coverage on AAC with a Hold rating and DCF-based PT of HKD148, implying 5.5% potential upside.

Global leader in acoustics, with new technologies keeping coming. Acoustics is AAC's cornerstone business that contributed 51.1% of its revenue in 1H17. Having boosted a cutting-edge in acoustics, AAC is on track to launching a re-designed stereo speaker box ('Super Linear Speaker') for Android customers in FY18E, with a 30% higher ASP compared with its existing acoustic products in our estimates. With an ever-increasing consumer appetite for more sophisticated and advanced smartphone features, we expect to see solid shipment growth with rising ASP in AAC's acoustic business over the coming 2-3 years, driven by 1) rising acoustic content per device; 2) new features such as stereo, waterproofing and audio enhancement; 3) new materials and technologies; and 4) rising demand for voice-enabled IOT devices.

2-3x higher ASP of new Haptics, increasingly the mainstream. AAC is a major supplier of haptics with LRA motors (gentle sensation and precision response) for Apple Inc.'s iPhone and Apple Watch. With full-screen becoming increasingly popular, we expect to see a proliferation of LRA configuration (as substitution of ERM motors) among Chinese smartphone vendors. Compared with ERM motors, haptics with LRA motors could see ASP 2-3x higher in our estimates.

Advanced RF products fitting well into 4G and 5G smartphones requirements. AAC's RF business (including structural components and antennas) builds on its strong foundation in precision molding, electromagnetic manufacturing and yield control from its acoustic business. Having been a supplier of mid-ranged RF products, AAC made inroads into the high-end RF products procurement of the major Chinese smartphone vendors (Huawei, OPPO and Meizu etc.) since 2H17. Its new RF products feature 3D glass with metallic middle frames and LDS antennas, which would increasingly become the mainstream for smartphones on 4.5G and upcoming 5G networks in our view. Though a later comer, AAC is well positioned to enjoy strong growth of its RF business.

AAC's foray into optics and 3D sensing. AAC has entered the optic market since 2009, having established its capacity in (plastic and glass) hybrid lens and pure-glass WLL ("wafer level lens") through its acquisitions of Kaleido and I. Square as well as investment in Heptagon (later on sold to AMS AG). Yet to reach mass production of hybrid lens, AAC could be a game-changer in next-generation optics for the rapidly emerging applications like AR and 3D sensing, in our view.

Initiate coverage with HOLD rating. Our DCF generated a valuation of HKD148, representing FY18E PER/PBR of 22.0x/7.0x respectively. AAC trades at FY18E PER of 20.9x and 18E PBR of 6.7x, which looks fair in view of its cementing industry-leading position and still expanding addressable market driven by new technologies, features and applications as well as upcoming 5G.

AAC Technologies (2018.HK)

Hold (Initiation) **Price Target** HK\$148 (Revision) Nil (upside) (5.5%)EPS 2017E 2018E revision Nil Nil HKD140.3 **Close price** Market cap. HKD171.3bn Free float 59.4% HKD75.25-HKD185.0 52-week range 3-mth ave. T/O HKD844.3mn

Price as of 17 Jan 2018

Stock rel HSI performance (%)



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AAC, the market leader triumphing ahead

Bucking a gloomy global smartphone market, trendy smartphone specs upgrade remained on an uptrend in the past 5 years. Following the launch of numerous flagship smartphones during the course of 2017, we foresee 2018 will be a revolutionary year for the smartphone industry in China. Meanwhile, key new features unveiled include 3D sensing, full screen display, AMOLED display, and neural engine embedded in APU (iPhone and Mate 10). Along with increased silicon content and optic content of smartphones, we see other upgrades in the smartphone peripherals had been led by acoustic components, haptic engine and antennas.

AAC riding on smartphone spec upgrade boom for numerous components

Riding on the smartphone specs upgrade boom, AAC became the first PRC-based electronic components manufacturer to surpass the HKD100bn market cap hurdle. AAC racked up the feat on the back of its leadership position as a formidable acoustic component giant, a major haptic motor/RF Mechanical vendor and an emerging optics player. AAC boasts a stunning track record of becoming a major contender for the top spots and attaining industry-leading gross margins on overcoming steep learning curves relatively shortly after its foray into the respective industries.

Leading component suppliers have benefitted from the increasing pace of consolidation of the global component industry and migration of electronics components production to China. While saturation of China's smartphone market has become more pronounced, market leaders such as AAC have been able to continue drive up their revenue and maintain margins at relatively stable levels by offering products with upgraded specs including stereo acoustics, waterproof features, 3D glass and haptic motors. Having forayed into the optic market since 2009, AAC further asserted itself as an all-rounder components manufacturer in acoustic, haptic, RF mechanical and optics.



Figure 1: Global smartphone shipment (mn units) and YoY growth rate (total)

Source: IDC, CSCI Research









State-of-the-art in premium acoustics

Acoustic components production is the cornerstone of AAC's successful business. Since establishment, AAC has accumulated over 20 years of experience in manufacturing miniature acoustic components for mobile phones and consumer electronic devices. AAC's key customers include Apple (47.2% of revenue in FY16), Samsung, Huawei, OPPO, and Xiaomi. AAC's acoustic business is moated given its leadership in electroacoustic technology, proprietary plastic injection know-how and automated manufacturing capability.

Rising acoustic content and upgraded specs, a prominent trend

The electroacoustic industry in China is undergoing a prominent trend in which 3C manufacturers seek upgraded acoustic solutions and boost acoustic dollar content by 1) utilising premium products with higher ASP and 2) increasing the number of acoustic components per device.

The major acoustic components in a smartphone consist of dynamic components and microphones: dynamic components include speaker modules (speakers) and receivers which are electroacoustic transducers converting electrical audio signals into corresponding sounds, whereas MEMS microphones work in the opposite way. Global leading suppliers of acoustic components for consumer electronics include AAC, Goertek, Knowles, Foster Electric and Merry. While AAC boasts leadership in dynamic components with c.35% market share compared to Goertek of c.20% and Knowles of c.10%, Knowles dominates the MEMS microphone market with c.50% market share (AAC with c.15% market share).

New features and technologies on acoustic components

AAC's major upgraded features in acoustic components include 1) stereo speaker box; 2) waterproof/dustproof and 3) audio display (hole-less display). In addition to the above upgrades, AAC's other goal is to achieve 'mini Hi-Fi' (High-Fidelity), which features inaudible noise/distortion and a flat frequency response within a designated frequency range. From the perspective of acoustic content, during customers' migration from single speaker/microphone to speaker box (module) and multiple microphones, AAC stands to benefit from the trend given its strong presence in both the speaker and microphone industry.

We also see the following trends of acoustic components emerging in the medium term: 1) increasing adoption of advanced technologies including Nanoscale/Silicone/Liquid Injection Molding (NIM/SIM/LIM) and new materials such as silicone diaphragm; 2) speaker sophistication and multiple microphone adoption; and 3) integrated design of acoustics and RF. We believe AAC will continue to entrench its leadership position in the acoustic components market on the back of its acoustic design/R&D capabilities, strong execution capability as well as yield control.

AAC's acoustic business to thrive on new iPhone and increasing speaker box adoption of Android camp

AAC is a major acoustic components supplier for Apple Inc., the leading global smartphone and smart device brand. With Apple's new line-up of iPhone series, we expect solid sales volume growth of iPhone to be fuelled by 1) iPhone X's stellar new features including 3D sensing ('TrueDepth'), Full-Screen OLED Display, A11 Bionic processor and wireless charging; 2) iPhone 7/7 Plus models turning to an incredible bargain after the price cut. In addition to Apple, AAC is also a major components supplier for smartphones of the Android camp. We believe AAC's products will continue to penetrate the Android camp and command rising margins in the years to come. Meanwhile, as AAC has scheduled to launch a re-designed stereo speaker box, 'Super Linear Speaker' ('SLS'), for Android customer in FY18E, we anticipate a total



shipment of 150mn units of such speaker boxes with a 30% higher ASP to be derived from this new acoustic platform for FY18E.

The adoption rate of miniature speaker module of the Chinese Android smartphone vendors is relatively low at c.30% versus 80% of international peers. However, we expect the increasing adoption of miniature speaker modules of the Android camp to drive dollar content growth for AAC. The demand for stand-alone speakers is expected to decline on the back of proliferation of speaker module adoption. According to our projection, AAC's revenues from speaker module/receivers/speakers are expected to grow at a CAGR of 20.3%/6.7%/1.4% during FY17E-19E respectively.

Further opportunities from MEMS microphones riding on proliferation of IoT market MEMS microphones are another focus of the company. Leveraging on the R&D of its design centre in Singapore, AAC is able to provide a series of MEMS microphones (starting supply of digital MEMS microphone by 4Q17 or early FY18) with high SNR (Signal-to-Noise Ratio), lower power consumption and higher consistency. Also, following its investment in Vesper Technology (16.1% stake by end-2016), AAC stands a higher chance of designing MEMS chips (ASIC) by itself, which will drive up the MEMS

The smartphone components segment is not the only growth driver of AAC's acoustic business. Smart Home (voice control) has become increasingly pronounced in this respect. Led by Sonos One, Google Home Max and Apple HomePod, we see a thriving IoT voice-enabled device market in the years to come. AAC, being one of the leading acoustic component suppliers, is set to benefit from this upcoming trend.



microphone gross margins substantially higher.

Source: iFixit, CSCI Research





Figure 7: AAC revenue mix and gross margin of acoustics



50%

40%

30%

20%

10%

0%

Source: Company, CSCI Research

Source: Company, CSCI Research



Cutting-edge in more advanced Haptics and RF

Haptic motor migrating from ERM to LRA

Since the introduction of the 'Taptic Engine' in iPhone 6s in 2015, it has become an integral component of the iPhone in delivering tactile feedback on an iPhone or Apple Watch. The feedback is designed to be more gentle than ringing and buzzing, which prompted Apple to switch from ERM ('Eccentric Rotating Mass') to LRA ('Linear Resonant Actuator') because of LRA's features including prompt response, precise controllability, multi-level sensations and lower power consumption. We expect a 30mn-50mn linear haptic motors shipment (mostly mid-to-low-end X-axis actuator, ASP ranges between USD0.8-3.0) to the Android camp in FY18E and foresee a long-term adoption rate of 50% of LRA haptic motors in the Android camp.

AAC is the world's first and largest X-axis actuator supplier and the leading supplier for iPhone and Apple Watch with c.50% share, according to our estimation. Other suppliers include Nidec Corp, Alps and Jinlong Machinery & Electronic. As the LRA technology has continued to penetrate the Android camp supplier chain, we expect the LRA upgrade will bring about a substantial growth (14.2% CAGR during FY17E-FY19E) of AAC's haptics business in the coming 2-3 years.

Integrating antenna and structural component

LDS antenna and 3D glass, the mainstream solution for smartphones in 5G era

Laser Direct Structuring ('LDS') antenna has grown to become a mainstream antenna solution for smartphones and a substitute of FPC antenna. While Flexible Printed Circuit ('FPC') antenna features better thickness, shape flexibility and is more suitable for customisation, LDS features 3D manufacturing precision, high integration (LTE, WiFi and FM radio) and stable connectivity. With 5G on its way, smartphone antenna is becoming increasingly complex with upgrade of mobile broadband (5G), carrier aggregation/beamforming enabled, massive MIMO (e.g., we expect iPhone to upgrade from 2×2 MIMO to 4×4 MIMO in FY18E) and advanced materials applied (e.g., LCP, Liquid Crystal Polymer).

3D glass incorporating a metallic middle frame is becoming a mainstream solution for smartphone structural components. 3D glass could tackle signal jamming problem (especially important in 5G era) and enables wireless charging. We see 3D glass has prevailed in competition with ceramic material as the back cover of smartphones.

AAC to enjoy strong growth from RF mechanical business

AAC possesses mobile antenna technology and molding/injection technology for manufacture of high-end smartphones' structural component (casing). Currently, AAC boasts top-3 leadership position in the LDS antenna industry. Its casing line-up is comprised of 3D glass, metallic middle frame and metallic casing. AAC boasts strength in proprietary molding equipment and glass hot bending equipment. In addition to metal frame and metal housing with antenna solutions, AAC enjoys a unique position in integrating acoustic, mechanical, antenna design/production and RF MEMS tuner technology. In addition, AAC is also one of a few suppliers who could solve interference between acoustics and RF.

With the current 3-4mn metal casing and 1mn 3D glass capacity per month (expanding to 2-2.5mn by 2Q18), AAC is well prepared to tap into high-end casing projects of major Chinese smartphone players in 2H17 or 1H18, in our view. We see the USD15-20 ASP for metallic middle frame incorporated with 3D glass could boost segment ASP substantially. In terms of structural components production, AAC currently deploys 5000-6000 CNC machines, in competition with sizeable suppliers such as Hon Hai, Catcher, BYDE, Everwin and Tongda.



Figure 8: Structure of LRA



Source: Somatic

Figure 10: Apple's vibration motor solutions by models

Figure 9: Eccentric Rotating Mass



Source: EE Times, CSCI research

Figure 11: Major haptic motor suppliers key financial metrics for the latest financial year



Figure 12: LDS antenna

Figure 13: FPC antenna



Source: Company







Figure 15: Structural components vendors financials



Source: Company, CSCI Research

Source: Company, CSCI Research



Optics help tap into AR and 3D-sensing markets

AAC began its venture in the optic business in 2009. Currently, AAC operates 6 optical design centres in Suzhou, Nanjing, Changzhou, Osaka, Seoul and Copenhagen. Leveraging on its advanced precision production know-how, world-class automated production line and advanced molding processing capability, AAC has become a potentially disruptive player in the optic lens industry.

AAC to become the game changer of next generation optics

AAC achieved a monthly shipment of pure-plastic lens set of 10mn by Nov-2017; the company is expanding its monthly capacity towards targets of 20mn by end-2017 and 30mn by 1H18. A majority (c.90%) of the plastic lens shipped features 5P and 13MP specs for Android customers. The technology roadmap of AAC is towards hybrid lens sets (1G5P or 1G4P) since glass lens offer better optical performance and enable 3D application. AAC has set a monthly capacity target for hybrid lens of 3mn-5mn by 1H18 and 5mn-10mn by 2H18. We believe hybrid lens will boost the ASP of lens sets (c.USD0.7 to c.USD2.0) and corporate GPM (Wafer Level Lens GPM 40%-50%) after yield improvement.

AAC has also absorbed the Wafer Level Glass Lens ('WLG') technology from Kaleido. Unlike WLL offered by Himax (HIMX US, NR) and AMS AG (Heptagon), AAC's WLG features pure glass, which could further improve lens' optical performance including larger aperture, transmittance, refractive index as well as thermal stability and small form factor. In terms of process, WLL is manufactured through depositing an epoxy on wafer through a mask, whereas WLG is made through molding techniques on both sides of glass wafer. Therefore, the aspherical surface of WLL is made of epoxy whereas that of WLG is made of glass. Currently, AAC's WLG is made on 2-inch wafers with 30-40 lens per wafer. When the process is upgraded to 4-inch wafer process, one wafer contains over 100 lens, it could boost production efficiency significantly compared to molding glass (currently processes 3 lens at a time at maximum) and enable mass production of hybrid lens.

Since the launch of 3D sensing function ('True Depth Camera System') on the iPhone X, a string of companies such as Himax (collaborating with Qualcomm) and Sunny Optical (collaborating with AMS AG) started venturing into this field. WLL has become one of the major solutions (among hybrid lens and plastic lens + AF) for the collimator of projection camera because of the heat tolerance advantage versus plastic lens and cost advantage in terms of material usage than molding glass lens. As the only WLL player in China and the only glass WLG player currently, AAC stands to ride the trend of 3D sensing and capitalise on the abundant opportunities of 3D sensing in applications of facial recognition and AR.

VCM business to unleash further potential of optic business

AAC also supplies VCMs for camera with resolution of 5MP, 8MP and 13MP. Although its shipment volume is still incomparable with its global leaders, we see synergy between its lens business and VCM business in the provision of integrated solutions to its customers. We believe its VCM business is well guarded by its automatic production capability and strong suit in electromagnetic design.

Hybrid lens, WLL and VCMs together could unleash AAC's optic potential in addition to AAC's gigantic acoustic business, in our view. We believe AAC's Hybrid lens may outperform conventional molded glass lens and casted glass lens in the long term because of WLL's cost advantage and optical performance.





Figure 17: Himax Wafer level optics production process



Source: Himax



Financials

Robust revenue and profit growth

In 1H17, AAC reported a strong set of results with top line and bottom line growth of 55.4%/57.0% YoY respectively. The robust growth was primarily attributable to the upsurge in revenue from haptics, as well as an only moderate increase in operating expenses. Looking forward, we expect AAC will continue to record solid top line and bottom line growth of 37.0%/22.6%/16.4% YoY and 37.9%/24.8%/19.0% YoY in FY17E/FY18E/FY19E respectively.

In terms of gross margin, AAC has maintained a smooth GPM trajectory in the past 10 years amid intensified competition and FX fluctuations. We foresee AAC's gross margin to remain stable at c. 40% level in FY17E-FY19E with the net profit margin widening gradually from 26.1% in FY17E to 27.2% in FY19E.

Gearing, cash flow and working capital

AAC's net gearing ratio rose from 1.6% as of end-2016 to 11.2% as of end-1H17 subsequent to additional bank borrowings for capacity expansion plans. Nonetheless, we expect AAC's net gearing ratio will gradually come down to net cash position and free cash flow is likely to pick up from FY18E when CAPEX growth moderates over time. Additional bank borrowings might be needed for Capex incurred in expanding its technology portfolio in optics, 3D Glass and acoustic production as well as factory infrastructure improvement and specialised machinery procurement.

AAC's overall cash conversion cycle decreased by 30.4 days to 6.5 days in FY16, mainly due to an increase in payable days (+25.3 days YoY) and stable receivable days. We expect AAC's activity level to continue to improve, thanks to its ascending negotiating power with suppliers.









Source: Company, CSCI Research estimates



Source: Company, CSCI Research estimates



Valuation

AAC is currently trading at 20.9x FY18E PER and 6.7x FY18E PBR, which are fair multiples compared to its peers considering its growth momentum and entrenched leadership. We believe DCF is the best method to valuate AAC because of its established model and cash generating capability. We initial coverage on AAC with a Hold rating and DCF-based price target of HKD148, representing 22.0x FY18E PER and 7.0x FY18E PBR.

Figure 22: Peers comparison table

			Close	Mkt cap	Rept'g	Fiscal	EPS Gro	wth (%)	ROE	(%)	Gross Ma	rgin (%)	EBITDA ma	argin (%)	Net Gear	ng (%)	EV/EBITI	DA (x)	PER	(x)	PBR	(x)	Yield (%)
Company name	Code	Ccy	(Local\$)	(US\$bn)	Ccy	Y/E	FY1	FY2	FY1	FY2	FY1	FY2	FY1	FY2	FY1	FY2	FY1	FY2	FY1	FY2	FY1	FY2	FY1	FY2
AAC Technologies Holdings Inc	2018 HK Equity	HKD	139.70	21.9	CNY	Dec	29.6	34.0	31.6	32.6	41.5	41.4	35.2	35.6	11.6	4.7	25.8	19.1	35.2	26.3	10.0	7.9	1.1	1.4
Acoustics																								
GoerTek Inc	002241 CH Equity	CNY	15.78	8.2	CNY	Dec	31.7	30.6	16.3	18.7	22.6	22.2	14.8	14.3	35.3	33.5	19.6	15.3	30.0	23.0	4.6	4.0	0.5	0.6
Knowles Corp	KN US Equity	USD	16.29	1.5	USD	Dec	44.6	(7.2)	(4.2)	7.3	39.0	38.8	19.3	19.5	24.5	4.6	10.4	9.3	17.3	18.7	1.4	n.a.	-	n.a.
Merry Electronics Co Ltd	2439 TT Equity	TWD	179.00	1.2	TWD	Dec	216.1	18.9	31.6	32.4	20.2	17.6	11.9	11.3	(45.0)	(28.0)	16.7	11.2	16.3	13.7	4.7	4.2	5.3	5.1
Foster Electric Co Ltd	6794 JP Equity	JPY	2,914.0	0.7	JPY	Mar	(111)	619	4.1	7.2	11.5	12.9	7.3	8.8	n.a.	n.a.	n.a.	n.a.	n.a.	16.7	1.2	1.2	1.4	1.4
Average							45.2	165.3	11.9	16.4	23.3	22.9	13.3	13.5	4.9	3.4	15.6	12.0	21.2	18.0	3.0	3.1	1.8	2.4
Haptics																								
Nidec Corp	6594 JP Equity	JPY	17,440.00	47.2	JPY	Mar	18.5	17.8	13.4	14.6	22.8	23.9	17.4	16.3	9.1	6.9	25.6	22.6	49.6	42.1	6.3	5.6	0.5	0.5
Samsung Electro-Mechanics Co L	009150 KS Equity	KRW	107,000.00	7.3	KRW	Dec	31.5	1,155	0.3	4.4	17.0	19.9	11.0	14.2	14.2	42.1	13.5	10.1	533.3	42.5	1.8	1.8	0.5	0.5
Jinlong Machinery & Electronic	300032 CH Equity	CNY	13.89	1.7	CNY	Dec	(60.4)	(15.8)	4.0	2.8	15.1	n.a.	7.2	8.6	(32.2)	(18.9)	44.5	35.3	73.1	86.8	2.4	2.4	0.7	0.6
Samsung Electro-Mechanics Co L	009150 KS Equity	KRW	45,350	2.9	KRW	Dec	397	182.3	1.5	3.6	17.3	18.7	11.7	14.1	24.2	25.6	6.3	5.2	61.2	21.7	0.8	0.8	1.2	1.3
LG Innotek Co Ltd	011070 KS equity	KRW	82,800	1.7	KRW	Dec	(135)	506.2	(2.0)	7.5	11.0	13.1	8.0	10.0	48.6	42.9	6.3	4.4	n.a.	14.5	1.2	1.1	0.4	0.4
Partron Co Ltd	091700 KS Equity	KRW	9,130.00	0.4	KRW	Dec	(42.2)	71.5	8.3	13.2	14.3	15.9	11.0	12.3	2.4	(5.0)	6.1	4.7	18.5	10.8	1.4	1.3	2.8	3.2
Average							34.8	319.4	4.3	7.7	16.2	18.3	11.0	12.6	11.0	15.6	17.1	13.7	147.1	36.4	2.3	2.2	1.0	1.1
RF Mechanical/Structural compor	nents																							
Amphenol Corp	APH US equity	USD	91.28	27.9	USD	Dec	11.9	18.2	23.8	26.0	32.5	33.0	23.2	23.6	47.2	n.a.	n.a.	n.a.	33.6	28.4	7.7	6.9	0.6	0.7
Shenzhen Sunway Communication	300136 CH Equity	CNY	42	6.7	CNY	Dec	127	88.5	32.1	37.8	34.8	33.6	26.5	26.2	(4.1)	(2.1)	67.2	38.2	78.8	41.8	21.8	14.4	0.1	0.2
Huizhou Speed Wireless Technol	300322 CH Equity	CNY	10.44	0.7	CNY	Dec	161.5	(1.3)	12.4	7.7	16.4	18.9	10.1	8.6	86.7	75.7	26.1	31.0	65.1	65.9	7.2	6.7	0.3	0.3
Catcher Technology Co Ltd	2474 TT Equity	TWD	338	8.6	TWD	Dec	(12.4)	3.7	18	17.7	41.3	45.0	47.1	47.6	(39.7)	(25.6)	5.5	4.9	11.6	11.2	2.1	1.9	3.0	3.2
BYD Electronic International C	285 HK Equity	HKD	18	5.2	CNY	Dec	38.5	115.2	11	19.8	7.6	11.8	7.7	11.4	(27.7)	(31.6)	11.0	6.3	27.0	12.5	2.9	2.4	0.9	1.2
Tongda Group Holdings Ltd	698 HK Equity	HKD	2	1.6	HKD	Dec	38.9	1.1	23	20.4	24.1	25.5	18.4	19.3	44.3	29.8	9.4	8.1	11.5	11.4	2.5	2.2	2.6	2.6
Shenzhen Everwin Precision Tec	300115 CH Equity	CNY	18.05	2.7	CNY	Dec	48.3	24.1	18.7	18.4	28.3	27.1	18.3	16.8	26.5	(1.4)	15.7	12.6	25.7	20.7	4.4	3.8	0.8	0.9
Average							59.1	35.6	19.9	21.1	26.4	27.8	21.6	21.9	19.0	7.5	22.5	16.8	36.2	27.4	6.9	5.5	1.2	1.3
Optics																								
ams AG	AMS SE equity	CHF	88.06	7.6	EUR	Dec	(34.6)	1.8	15.3	9.9	55.0	40.4	29.0	21.8	37.5	87.9	40.4	30.7	54.3	53.3	8.1	6.9	0.7	0.5
Sunny Optical Technology Group	2382 HK Equity	HKD	110.80	15.6	CNY	Dec	65.9	107.1	29.1	42.7	18.3	20.8	12.3	14.9	(28.1)	(10.4)	55.6	29.1	77.7	37.5	20.5	14.2	0.3	0.6
Largan Precision Co Ltd	3008 TT Equity	TWD	4,000.00	18.1	TWD	Dec	(5.9)	14.3	32.4	31.3	66.6	68.6	61.9	65.4	(72.4)	(73.1)	16.1	13.4	23.5	20.6	6.9	5.7	1.6	1.7
Genius Electronic Optical Co L	3406 TT Equity	TWD	292.00	1.0	TWD	Dec	86.4	470.3	(2.4)	(4.5)	n.a.	38.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	50.3	4.6	n.a.	-	n.a.
TDK Corp	6762 JP Equity	JPY	9,900.0	12.0	JPY	Mar	(8.2)	113.6	17.1	10.9	34.0	29.6	23.8	17.3	(4.2)	9.9	4.9	6.8	19.8	9.3	1.7	1.6	1.2	1.2
Average							20.7	141.4	18.3	18.1	43.5	39.6	31.7	29.9	(16.8)	3.6	29.2	20.0	43.8	34.2	8.4	7.1	0.8	1.0

Source: Bloomberg, CSCI Research (prices as of 17 Jan 2017)







Source: Company, CSCI Research estimates

Source: Company, CSCI Research estimates





Appendix

Company profile

AAC Technologies is a total-solution components provider offering cutting-edge and advanced miniaturised components to the global consumer electronics industry. While entrenching its role as the leading global supplier of miniaturised acoustic components including speaker modules, speakers, receivers and MEMS microphones, AAC also delivers integrated components solutions across multiple segments incorporating haptic vibrators, RF (Radio Frequency) Mechanical and optical components. AAC's products are utilised in manufacture of smartphones, tablets, wearables and ultra slim notebooks. The company has a global presence with research and development centres in the PRC, Singapore, Japan, the US and Denmark, testing laboratories in Singapore and South Korea as well as manufacturing facilities in the PRC and Vietnam.

Figure 25: Shareholding structure



Please read the disclaimer on the last page.



Figure	26:	AAC	kev	Milestones
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Year	Events
1993	Founded (known as Shenzhen Yuanyu) to manufacture basic miniature acoustic components
1996	Established AAC US to handle direct sales in US
1998	Qualified by Motorola as a supplier of transducers
2000	Commenced manufacturing of miniature receivers
	Established AAC Germany to provide sales services to European customers
2002	Started mass production of multi-function device, polyphonic speaker and ECM microphone
2003	Began manufacturing headsets
2005	Listed on Hong Kong Stock Exchange
	Qualified by Sony-Ericsson as a supplier of speaker modules
2008	Qualified as a supplier for HTC and Google;
	Established South Korea office
2009	Acquired LTCC R&D and manufacturing business in South Korea
	Invested in Wafer Level Optics (WLO) leader Kaleido Tech
2010	Built automated production line for speaker and earpiece
2011	Started shipment for Samsung
	Penetrated into tablet and electronic book segments
2013	Carried out RF business (Antenna, NFC, Wireless Charging)
	Start shipping 5MP plastic lens to Chinese customer
2015	Started shipping of front camera lens
	Acquired WiSpry to boost position as a unique RF solution provider
2016	Enters Hang Seng Index
2017	Optical lens (not less than 5P, 13MP) monthly production capacity reach 10mn sets.

Source: Company, CSCI Research



Management profile

Mr. Benjamin Zhengmin Pan (executive Director and CEO). Mr. Pan, aged 49, co-founded the Group in 1993. Mr. Pan is responsible for providing strategic direction and leadership and for developing and implementing the group's strategic objectives and business plans. Specifically, Mr. Pan is responsible for overseeing the coordination between sales and marketing, research and development, manufacturing, and other functions including quality assurance, finance and human resources. Mr. Pan has been instrumental in spearheading the Group's expansion outside the PRC. In 1996, he co-founded and was appointed President and CEO of American Audio Component Inc. ("AAC U.S."). Mr. Pan also co-founded Shenzhen Meiou Electronics Corporation ("Shenzhen Meiou") in 1998 and American Audio Components (Changzhou) Co., Ltd. ("Changzhou AAC") in 2000. In addition to his experience in sales and marketing, manufacturing and management, he has also been instrumental in leading the group's research and development strategy, and has developed a number of patents used in the design and manufacturing some of the Company's acoustic products. Mr. Pan graduated from the Jiangsu Province Wujin Teacher School in 1987. Mr. Pan is the spouse of Ms. Ingrid Chunyuan Wu ("Ms. Wu"), the non-executive Director and a substantial Shareholder of the company.

Mr. Mok Joe Kuen Richard (executive Director). Mr. Mok, aged 54, is an executive Director of the Company. With over 20 years of experience in the financial services industry: employments with international accountancy firms such as KPMG, the Hong Kong-listed brokerage South China Group, Asian Capital Partners Group and the Hong Kong-listed banking group Dah Sing Financial Holdings. Mr. Mok is a member of the Hong Kong Institute of Certified Public Accountants and the Institute of Chartered Accountants in England and Wales. Mr. Mok holds a diploma in applied psychology from Hong Kong Baptist University and graduated with a Bachelor's degree in economics from the London School of Economics and Political Science, London University.

Ms. Wu (Non-executive Director). Ms. Wu, aged 47, is a non-executive Director of the company and a member of the Audit and Risk Committee of the company (the "Audit and Risk Committee"). Ms. Wu co-founded the group in 1993. In 1996, she co-founded and later became chief financial officer of AAC U.S.. She also co-founded Shenzhen Meiou in 1998, Changzhou AAC in 2000, and YEC Electronics Limited in 2001. Before Mr. Du Kuang-Yang joined the Group as the chief operating officer in March 2005, Ms. Wu was responsible for the day-to-day operations of these companies. Ms. Wu graduated from Changzhou School of Public Health in 1989. Ms. Wu is the spouse of Mr. Pan, the executive Director, CEO and a substantial Shareholder of the Company. She has directorship in a number of subsidiaries of the Company. She is currently a director of Shenyang General Magnetic Co., Ltd. in China.



Figure 27: Technical terms

Technical terms	Explanation
Stereo	Stereo has gradually become a mainstream spec in acoustic. Stereo, or stereophonic sound, is a method of sound reproduction creating an illusion of multi-directional audible perspective. Stereo can be achieved by utilising two or more independent audio channels through configuration of speakers (loudspeakers) in a stereo speaker module to create the impression of sound heard from various directions as the case in natural hearing. As multiple speakers are employed, only speaker module could offer this feature.
LDS	LDS technology is using laser to activate metallic particles of plastic casings with metal components and galvanise the plastic materials with copper sheets, the 3D design can directly turn a handset casing into antenna to receive signals.
ERM	'Eccentric Rotating Mass', ERM is the most mature haptic technology in the market. ERM is comprised of an off-centre rotating mass. As it spins, it creates an omni-directional vibration that propagates throughout the entire device (whereas LRA, Linear Resonant Actuator, uses a motor to move a small rod back and forth in the cabinet to create the vibration).
Dynamic speaker	A mainstream type of speaker invented in 1915 which operates on the same principle but in reverse of a dynamic microphone: dynamic speaker works when an alternating current electrical audio signal applied to voice coil, a coil of wire suspended in a circular gap between poles of permanent magnet, the coil is coerced to move rapidly back and forth due to faraday's law of induction, which caused a diaphragm (usually conically shaped) attached to the coil to move back and forth as well, pushing the air to create sound waves.
Audio Display	Utilize an 'exciter' to drive the screen to vibrate. Air is pushed by the vibrating screen and sound is radiated, which could enable hole-less display (receiver replaced by an actuator).

Source: Company, Wikipedia

Figure 28: Acoustic component production process



Source: Company



Figure 29: DCF valuation

FY ended: Dec (RMB mn)	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Revenue	26,052	30,324	34,266	38,309	42,370	46,353	50,246	53,965	57,418	60,289
Revenue growth	22.6%	16.4%	13.0%	11.8%	10.6%	9.4%	8.4%	7.4%	6.4%	5.0%
EBIT	7,969	9,413	10,765	12,195	13,662	15,101	16,536	17,902	19,194	20,344
EBIT margin	30.6%	31.0%	31.4%	31.8%	32.2%	32.6%	32.9%	33.2%	33.4%	33.7%
Depreciation and amortization	1,650	1,982	2,180	2,354	2,472	2,596	2,648	2,701	2,728	2,673
Depr / capex	0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8
EBITDA	9,619	11,395	12,945	14,549	16,134	17,697	19,183	20,603	21,921	23,018
EBITDA margin	36.9%	37.6%	37.8%	38.0%	38.1%	38.2%	38.2%	38.2%	38.2%	38.2%
Effective tax rate	11.5%	11.4%	11.8%	12.3%	12.7%	13.2%	13.6%	14.1%	14.5%	15.0%
NOPAT	7,051	8,344	9,493	10,698	11,923	13,110	14,281	15,380	16,402	17,293
Change in WC	(295)	(369)	(399)	(431)	(461)	(484)	(499)	(494)	(479)	(431)
Operating CF	8,405	9,956	11,274	12,622	13,934	15,222	16,430	17,587	18,651	19,535
Capex	5,238	4,461	4,372	4,284	4,199	4,073	3,950	3,753	3,565	3,209
Capex as % of revenue	20.1%	14.7%	12.8%	11.2%	9.9%	8.8%	7.9%	7.0%	6.2%	5.3%
FCF	3,167	5,495	6,902	8,337	9,735	11,149	12,479	13,834	15,085	16,326
Sum of forecast period FCF	62,653									
Terminal value	90,315									
Enterprise value	152,968									
Debt	4,741									
Cash	2,974									
Equity value	151,202									
Number of shares outstanding	1,228									
Equity value per share (RMB)	123.1									
RMB / HKD	1.20									
Equity value per share (HKD)	147.8									

Source: Company, CSCI Research



AAC Technologies: Cutting-edge technologies keep coming

2015	2016	2017E	2018E	2019E
11,739	15,507	21,251	26,052	30,324
(6,867)	(9,064)	(12,461)	(15,382)	(17,969)
4,872	6,443	8,790	10,670	12,355
(257)	(291)	(335)	(333)	(372)
(859)	(1,166)	(1,566)	(1,880)	(2,037)
(546)	(472)	(576)	(645)	(697)
3,210	4,514	6,313	7,812	9,249
252	195	126	167	176
3,462	4,708	6,439	7,979	9,425
(22)	(67)	(125)	(136)	(108)
(5)	(9)	(10)	(11)	(12)
-	-	-	-	-
3,435	4,633	6,305	7,833	9,306
(325)	(609)	(754)	(903)	(1,057)
3,110	4,024	5,551	6,930	8,248
3	(1)	0	0	1
3,107	4,026	5,551	6,930	8,248
2.53	3.28	4.52	5.64	6.72
2.53	3.28	4.52	5.64	6.72
1.20	1.47	2.14	2.69	3.20
	2015 11,739 (6,867) (257) (859) (546) 3,210 252 3,462 (22) (5) - - 3,435 (325) 3,110 3,107 - 2,53 2,53 1,20	2015 2016 11,739 15,507 (6,867) (9,064) 4,872 6,443 (257) (291) (859) (1,166) (546) (472) 3,210 4,514 252 195 3,462 4,708 (22) (67) (5) (9) - - 3,435 4,633 (325) (609) 3,110 4,024 3 (1) 3,107 4,026 2,53 3,28 2,53 3,28 1,20 1.47	2015 2016 2017E 11,739 15,507 21,251 (6,867) (9,064) (12,461) 4,872 6,443 8,790 (257) (291) (335) (859) (1,166) (1,566) (546) (472) (576) 3,210 4,514 6,313 252 195 126 3,462 4,708 6,439 - - - (22) (67) (125) (5) (9) (10) - - - 3,435 4,633 6,305 (325) (609) (754) 3,110 4,024 5,551 3 (1) 0 3,107 4,026 5,551 2,53 3,28 4,52 2,53 3,28 4,52 1,20 1.47 2.14	2015 2016 2017 2018e 11,739 15,507 21,251 26,052 (6,867) (9,064) (12,461) (15,382) $4,872$ 6,443 8,790 10,670 (257) (291) (335) (333) (859) (1,166) (1,566) (1,880) (546) (472) (576) (645) 3,210 4,514 6,313 7,812 252 195 126 167 3,462 4,708 6,433 7,812 (22) (67) (125) (136) (5) (9) (10) (11) - - - - 3,462 4,633 6,305 7,833 (325) (609) (754) (903) 3,110 4,024 5,551 6,930 3,107 4,026 5,551 6,930 3,107 4,026 5,551 6,930 3,28 4,52

Cash flow statement (RME	3mn)				
Year end: Dec	2015	2016	2017E	2018E	2019E
EBIT	3,462	4,708	6,439	7,979	9,425
Depreciation & amortisation	525	711	962	1,255	1,650
Net interest	(22)	(67)	(125)	(136)	(108)
Taxes paid	(325)	(609)	(754)	(903)	(1,057)
Changes in working capital	(291)	(286)	(985)	(295)	(369)
Others	411	354	380	564	495
Cash flow from operations	3,760	4,812	5,918	8,464	10,035
Capex	(2,586)	(3,399)	(5,342)	(5,238)	(4,461)
Acquisitions	(95)	(6)	(201)	(59)	(32)
Disposals	20	19	94	122	158
Others	192	(732)	(128)	(177)	36
Cash flow from investing	(2,469)	(4,117)	(5,577)	(5,352)	(4,299)
Dividends	(940)	(1,314)	(2,220)	(2,772)	(3,299)
Issue of shares	-	-	(0)	-	-
Change in debt	300	2,201	1,175	(527)	(1,697)
Others	(82)	(90)	1	1	1
Cash flow from financing	(721)	797	(1,045)	(3,298)	(4,995)
Change in cash	570	1.491	(704)	(186)	741
Free cash flow	964	1,360	588	3,167	5,495

Balance sheet (RMBmn)

Balance sheet (RMBmn)						Key ratios					
Year end: Dec	2015	2016	2017E	2018E	2019E	Year end: Dec	2015	2016	2017E	2018E	2019E
Cash	2,224	3,864	3,160	2,974	3,715	Operating ratios					
Short term investments	-	-	-	-	-	EBIT margin (%)	29.5	30.4	30.3	30.6	31.1
Accounts receivables	4,196	6,156	7,797	8,594	9,488	Net margin (%)	26.5	26.0	26.1	26.6	27.2
Inventory	1,718	2,623	3,501	4,221	5,016	Effective tax rate (%)	9.5	13.1	12.0	11.5	11.4
Other current assets	43	186	128	157	192	Revenue growth (%)	32.2	32.1	37.0	22.6	16.4
Total current assets	8,181	12,829	14,586	15,946	18,411	Net income growth (%)	34.1	29.6	37.9	24.8	19.0
PP&E	7,080	9,494	13,527	17,045	19,433	EPS growth adj (%)	34.1	29.6	37.9	24.8	19.0
Intangible Assets	156	167	175	184	196	DPS growth (%)	25.0	22.5	45.6	25.6	19.0
Associates and JVs	6	14	7	5	4						
Other long term assets	998	1,753	2,110	2,329	2,305	Efficency ratios					
Total long term assets	8,239	11,428	15,819	19,563	21,938	ROE (%)	27.5	28.4	31.7	32.0	31.0
TOTAL ASSETS	16,420	24,257	30,405	35,509	40,348	ROCE (%)	28.6	31.1	34.3	34.9	34.1
						Asset turnover (x)	0.7	0.6	0.7	0.7	0.8
Short term debt	1,159	3,303	4,162	3,746	2,248	Op cash / EBIT (x)	1.1	1.0	0.9	1.1	1.1
Accounts payables	2,919	5,346	6,843	8,074	9,407	Depreciation / CAPEX (x)	0.2	0.2	0.2	0.2	0.4
Other current liabilities	248	476	605	827	1,060	Accounts receivable days	125.1	121.8	119.8	114.8	108.8
Total current liabilities	4,326	9,125	11,610	12,647	12,714	Accounts payable days	141.1	166.4	178.5	177.0	177.5
Long term debt	649	789	1,105	994	795						
Deferred tax	49	48	53	58	64	Leverage ratios					
Other long term liabilities	42	80	92	106	122	Net gearing (%)	(3.7)	1.6	12.0	8.1	(2.5)
Total long term liabilities	740	917	1,249	1,158	981	Net debt / EBITDA (x)	0.1	(0.0)	(0.3)	(0.2)	0.1
TOTAL LIABILITIES	5,066	10,042	12,859	13,805	13,695	Interest cover (x)	157.7	70.5	51.6	58.7	87.6
						Current ratio (x)	1.9	1.4	1.3	1.3	1.4
Shareholders' funds	11,307	14,189	17,519	21,677	26,626						
Minority Interests	47	26	26	27	27	Valuation					
TOTAL LIAB AND EQUITY	16,420	24,257	30,405	35,509	40,348	PER (x)	49.6	39.1	27.7	22.0	18.5
						EV/EBITDA (x)	36.9	27.9	20.3	16.1	13.3
Net cash / (debt)	416	(228)	(2,107)	(1,766)	672	PBR (x)	13.6	11.1	8.8	7.0	5.7
						Dividend yield (%)	0.8	1.0	1.4	1.8	2.2

Source: Company, CSCI Research estimates



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Company Rating Definition

The Benchmark: Hong Kong Hang Seng Index; Time Horizon: 12 months

Buy	12-month absolute total return: >=10%

Hold12-month absolute total return: >-10% but <10%</th>

Sell 12-month absolute total return: <=-10%

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