

## Greater China Smartphone Sector

### The more the merrier: multi-cameras are the next mega trend in smartphones (Part 2)

- We are raising our forecasts for dual-cam adoption in smartphones in 2017-18, driven by aggressive adoption by China brands
- The emergence of biometric ID and 3D sensing should further increase the number of cameras in smartphones in the long term
- We view this trend as positive for the smartphone camera component supply chain; Lagan and Sunny Optical remain our top picks

Negative Neutral Positive



**Positive**  
(unchanged)

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**What's new:** We have been highlighting the rise of multi-cameras as an emerging trend with positive implications for the smartphone camera supply chain (see [The more the merrier: multi-cameras are the next mega trend in smartphones](#), 2 August 2016). But our recent research suggests multi-cam adoption is likely to be faster than we had expected, given China brands' strong interest in such technology. Moreover, the adoption of biometric ID/3D sensing in smartphones would underpin further upside for the supply chain in the long term, in our view. Within the Greater China smartphone space, **Lagan Precision (3008 TT, TWD4,465, Buy [1])** and **Sunny Optical (2382 HK, HKD51.05, Buy [1])** remain our top picks.

**What's the impact: Dual-cam adoption looks set to accelerate from 2017.** Thanks to the popularity of the iPhone 7 Plus, smartphone brands seem increasingly keen to adopt dual cams in 2017. Hence: 1) we look for Apple (AAPL US, USD139.79, Outperform [2]) to increase its dual-cam adoption to 70% of new iPhones in 2H17 (vs. 36% in 2H16), 2) Samsung (SEC) (005930 KS, KRW1,981,000, Buy [1]) is likely to release its first dual-cam smartphone in 2H17 (vs. our earlier expectation of 1H17, due possibly to software issues), and 3) alongside Huawei, our research indicates China brands Oppo and Vivo are strong supporters of dual-cams and are targeting 25-30% adoption within their product lines. In sum, we expect the strength among China brands to outweigh the possible delay in adoption by SEC. We now forecast dual-cam smartphone of 255m in 2017 and 420m in 2018 (vs. 230m and 390m previously), with adoption rates of 16% and 26% in 2017 and 2018, respectively, from 5% in 2016.

**Biometric ID/3D sensing should provide further upside.** We see dual-cams as the start of a trend of smartphones with multi-cams. Indeed, multi-cams/trio-cams should soon hit the market, driven not just by image enhancement but features like augmented reality/3D. We believe the next iPhones are likely to feature an extra front camera to support a mooted biometric ID feature known as IRIS (see [Embracing spec upgrade trends for the next iPhones](#)). Also, our research in the market indicates Apple may incorporate a 3D sensing feature (ie, gestures) that would rely on the extra cam. We would view such developments as positive for the camera component supply chain, as they would broaden the addressable market.

**What we recommend:** We reiterate our Positive sector view and see the multi-cam trend benefiting the overall camera component supply chain, but particularly the leaders – **Lagan**, the leader in high-end lens sets, and **Sunny**, the major camera module and lens set provider. These 2 stocks remain our top picks in the Greater China Smartphone space, given our expectation of strong earnings growth on the back of favourable industry trends. The key risk: weaker-than-expected dual-cam adoption.

**How we differ:** We are more upbeat than the market on the benefits from spec upgrades that we expect to accrue to our preferred names.

#### Key stock calls

	New	Prev.
<b>Lagan Precision (3008 TT)</b>		
Rating	Buy	Buy
Target	5,600	4,800
Upside	▲ 25.4%	
<b>Sunny Optical Technology (2382 HK)</b>		
Rating	Buy	Buy
Target	61.50	44.30
Upside	▲ 20.5%	

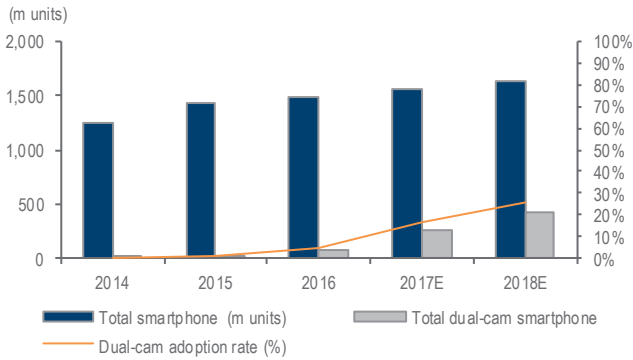
Source: Daiwa forecasts

# Sector stocks: key indicators

Company Name	Stock code	Share Price	Rating		Target price (local curr.)			EPS (local curr.)					
			New	Prev.	New	Prev.	% chg	FY1			FY2		
								New	Prev.	% chg	New	Prev.	% chg
Largan Precision	3008 TT	4,465	Buy	Buy	5,600	4,800	16.7%	169.392	169.392	0.0%	275.689	260.558	5.8%
Sunny Optical Technology	2382 HK	51.05	Buy	Buy	61.50	44.30	38.8%	1.153	1.097	5.1%	1.766	1.482	19.2%

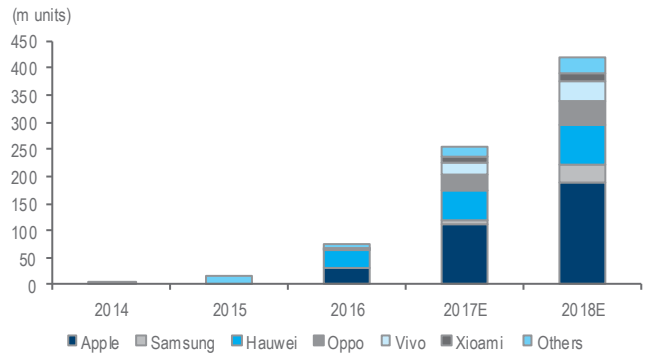
Source: Bloomberg, Daiwa forecasts

## Dual-cam penetration in smartphones (2014-18E)



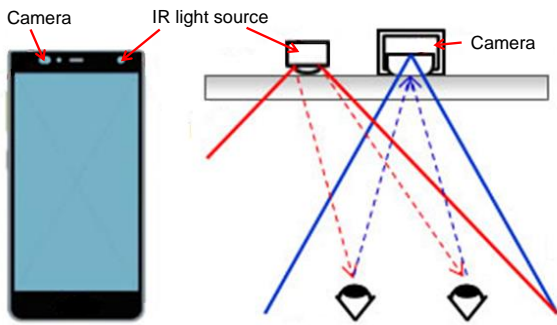
Source: Daiwa estimates and forecasts

## Smartphone with dual cams by brand (2014-18E)



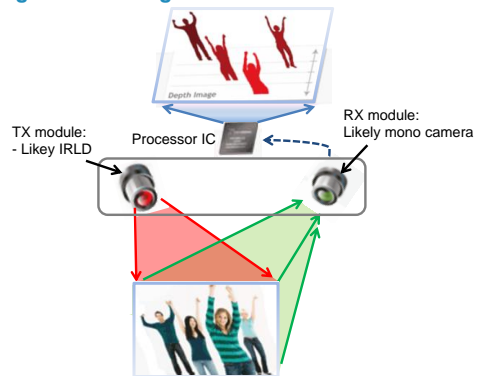
Source: Daiwa estimates and forecasts

## Biometric ID: iris scanner design



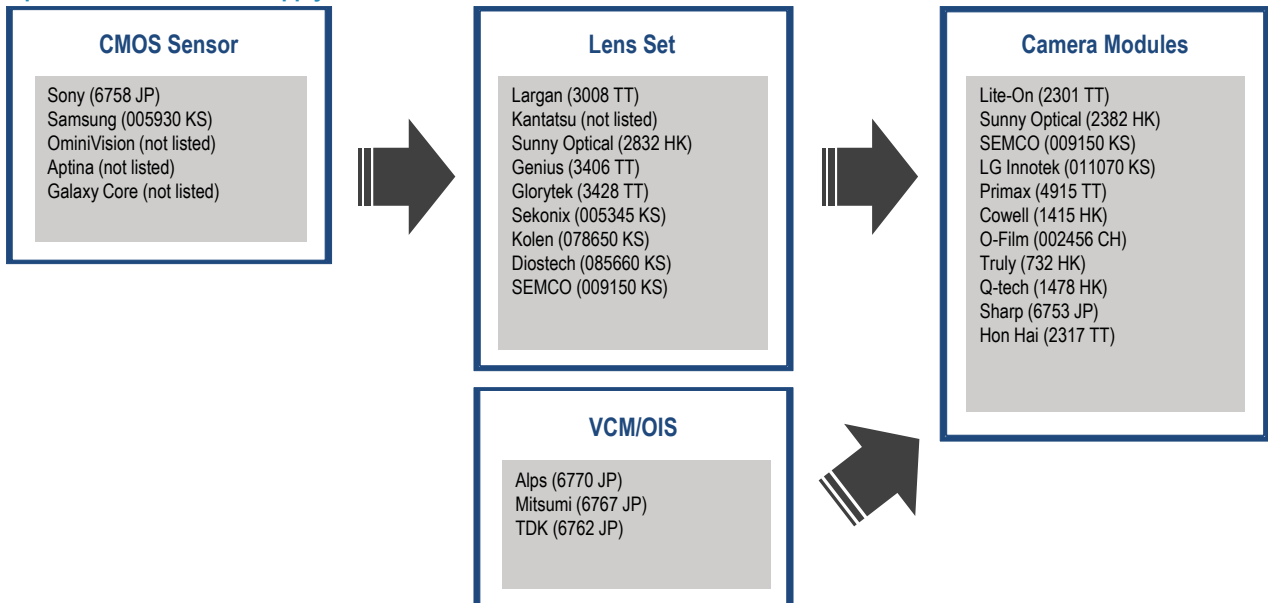
Source: Daiwa

## 3D sensing module design



Source: Daiwa

## Smartphone camera module supply chain



Source: Companies, Daiwa

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## Multi-cameras: the next mega trend for smartphones (Part 2)

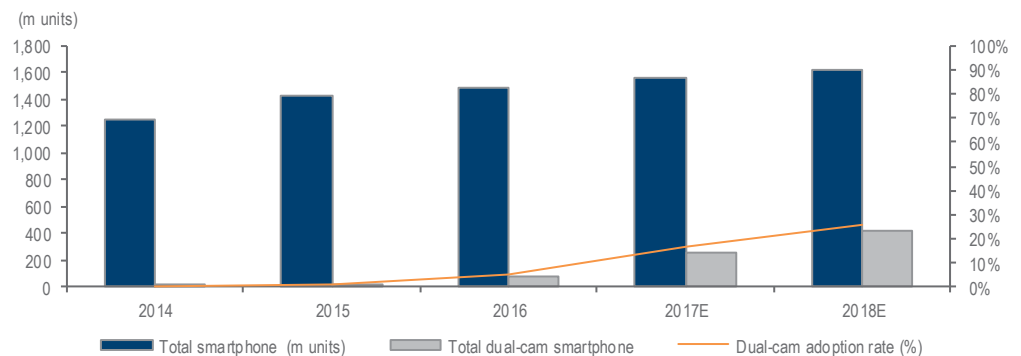
**We are revising up our smartphone dual-cam adoption forecasts to 255-420m in 2017-18, driven by strong interest from China smartphone brands**

### Dual-cam adoption likely to accelerate in 2017

As discussed in [The more the merrier: multi-cameras are the next mega trend in smartphones](#), published on 2 August 2016, we see the adoption of dual-cams as an emerging mega trend in smartphones as it solves the dilemma of image quality versus size given the smartphone form-factor design (see Appendix 1). We also expect the iPhone 7 Plus – the first dual-cam model released by Apple in September 2016 – to spur interest and drive adoption going forward. Indeed, with the popularity of the iPhone 7 Plus, we have seen rising interest from other smartphone brands to adopt dual-cams in 2017. In addition to Apple, which we expect to increase its dual-cam adoption to 70% of new iPhones in 2H17 (vs. 36% in 2H16), there is also strong interest from China smartphone brands.

In addition to Huawei, which has been a strong supporter of dual-cams since 2016, other China brands such as Oppo and Vivo have also become strong advocates for dual-cams and target 25-30% adoption of dual-cams in their smartphones this year, based on our market research. For SEC, we understand there have been some delays due to software issues and now expect its first dual-cam smartphone in 2H17 (vs. our earlier expectation of 1H17). In total, we believe the strength of demand from China brands will exceed the delay from SEC and expect dual-cam smartphone shipments to reach 255m in 2017E and 420m in 2018E (vs. our earlier forecasts of 230m in 2017E and 390m in 2018E), with the adoption rate rising to 16% and 26% in 2017 and 2018, respectively, from 5% in 2016.

### Global dual-cam penetration in smartphones



Source: Daiwa estimates and forecasts

### Dual-cam adoption among major brands

**Apple** introduced its very first dual-cam smartphone – the iPhone7 Plus – in September 2016, in line with our earlier estimate. Given the popularity of the iPhone 7 Plus, we expect Apple to raise the dual-cam adoption rate for its new models in 2017. Our market research suggests Apple is likely to release 3 iPhone models this September – the iPhone 7S, iPhone 7S Plus, and iPhone 8. We expect both the iPhone 7S Plus and iPhone 8 to feature a dual-cam. In terms of shipments, we forecast dual-cam iPhones to account for 70% of new iPhones in 2H17 (vs. 36% in 2H16). In terms of total iPhone shipments, we look for the adoption rate to rise to 49% in 2017E from 14% in 2016.

**SEC** has not announced plans for a dual-cam design in its product portfolio. We had expected SEC to incorporate dual-cams in its flagship model (the S8) in 1H17E; however, our recent research suggests this plan has been postponed due to software issues. We now expect SEC to release its first dual-cam smartphone in 2H17 and to carry this design into its flagship models in 2018. We estimate SEC's dual-cam adoption rate would reach 8m in 2017, from zero in 2016.

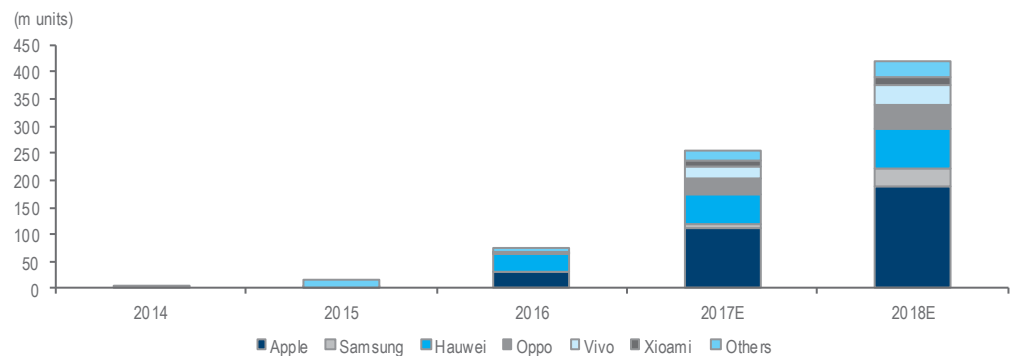
**Huawei** was the first Chinese brand to aggressively utilise dual-cameras in its smartphones. In April 2016, Huawei released its flagship model, the P9/P9 Plus, which received good feedback from consumers. The company has since been bullish on dual-cam adoption, launching 5 smartphone models with dual-cams in 2016 (Honor V8, Honor 8, Honor 6x, Mate9/9 Pro and Honor Magic). Huawei announced a further 2 models with dual-cams, the Honor V9 and its new flagship model the P10/10 Plus, at the Mobile World Congress in Barcelona in February 2017. Our research suggests Huawei is likely to remain bullish on dual-cams and we estimate dual-cam adoption for Huawei to reach 55m in 2017, from 32m in 2016.

**Opportunity** is one of the fastest-growing smartphone brands in China and became a global top-5 smartphone brand in 2016 in terms of sales volume. The company did not release any dual-cam smartphones in 2016, but we expect this trend to reverse in 2017. Our research suggests Oppo has a strong interest in dual-cameras which are a major focus for its smartphone models in 2017. We estimate dual-cam adoption for Oppo to reach 29m in 2017, from zero in 2016.

**Vivo** is another of China's fastest-growing smartphone brands, becoming a global top-5 smartphone brand in 2016 in terms of sales volume. Vivo was not overly bullish on dual-cam adoption until late 4Q16. The company released its first dual-cam smartphone – the Xplay6 – in November 2016 and has released 2 further models (X9/ X9 Plus and V5 Plus) since then. We estimate dual-cam adoption for Vivo to reach 24m in 2017, from 3m in 2016.










**Xiaomi** released 2 dual-cam smartphones, the Redmi Pro and the Mi 5 Plus, in 2H16. Our research suggests Xiaomi will be more aggressive on dual-cam adoption in 2017, and we estimate dual-cam adoption for Xiaomi to reach 12m in 2017, from 4m in 2016.

#### Global dual-cam adoption in smartphones by brand













Source: Daiwa estimates and forecasts












## Major dual-cam models in 1Q17

	1Q17								
Model	Huawei P10	Huawei P10 Plus	Huawei Honor V9	LG G6	Vivo V5 Plus	ZTE Blade V8	ZTE Hawkeye	ZTE Blade V8 Pro	Asus Zenfone 3 Zoom
Model Picture:									
Dimensions(mm):	145.3 x 69.3 x 7	153.5 x 74.2 x 7	157 x 77.5 x 7	148.9 x 71.9 x 7.9	152.6 x 74 x 7.3	148.4 x 71.5 x 7.7	154 x 76 x 7.9	156 x 77 x 9.1	154 x 76 x 7.9
Weight:	145 g	165 g	184 g	163 g	158.6 g	141 g	-	185 g	-
ROM capacity:	32GB	64GB	64GB	32GB	64GB	16GB	32GB	32GB	32GB
RAM capacity:	4GB	4GB	4GB	4GB	4GB	2GB	3GB	3GB	3GB
Display Diagonal:	5.1"	5.5"	5.7"	5.7"	5.5"	5.2"	5.5"	5.5"	5.5"
Display Resolution (pixels):	1080 x 1920	1440 x 2560	1440 x 2560	1440 x 2880 pixels	1080 x 1920	1080 x 1920 pixels	1080 x 1920	1080 x 1920	1080 x 1920
Pixel density:	432 ppi	540 ppi	515 ppi	564 ppi	401 ppi	424 ppi	401 ppi	401 ppi	401 ppi
Camera resolution:	20MP + 12MP	20MP + 12MP	12MP + 12MP	13MP + 13MP	16MP	13MP + 2MP	13MP + 12MP	13MP + 13MP	13MP + 12MP
OIS:	Yes	Yes	No	Yes	No	No	No	No	No
Secondary Camera:	8MP	8MP	8MP	5MP	20MP + 8MP	13MP	8MP	8MP	8MP
Battery Capacity:	3200 mAh	3750 mAh	4000 mAh	3300 mAh	3160 mAh	2730 mAh	3000 mAh	3140 mAh	3000 mAh
Launched date	Feb-17	Feb-17	Feb-17	Feb-17	Jan-17	Jan-17	Jan-17	Jan-17	Jan-17
Price-USD	-	-	-	USD750	-	USD230	USD200	-	USD200
Price-CNY	CNY3488	CNY4988	CNY2,599	-	CNY2,892	-	-	CNY2100	-

## Major dual-cam models in 4Q16

	4Q16									
Model	Huawei Honor Magic	Gionee M2017	Gionee S9	Vivo Xplay6	Huawei Mate 9	Vivo X9	Vivo X9 Plus	ZTE Axon 7 Max	Huawei Honor 6x	ZTE nubia Z11 mini S
Model Picture:										
Dimensions(mm):	146 x 69.9 x 7.8	155 x 77.6 x 7.4	154 x 76.4 x 7.4	154 x 73.6 x 8.4	157 x 78.9 x 7.9	152.6 x 74 x 7	162 x 79 x 7.5	157 x 80.4 x 8.2	151 x 72.6 x 8.2	146 x 72.1 x 7.6
Weight:	145 g	238 g	168.2 g	178 G	190 g	154 g	199 g	196 g	162 g	158 g
ROM capacity:	64 GB	128 GB	64 GB	128 GB	32 GB	64 GB	64 GB	64 GB	32 GB	64 GB
RAM capacity:	4 GB	6 GB	4 GB	6 GB	4 GB	4 GB	6 GB	4 GB	3 GB	4 GB
Display Diagonal:	5.09"	5.7"	5.5"	5.46"	5.9"	5.5"	5.88"	6.0"	5.5"	5.2"
Display Resolution (pixels):	1440 x 2560	1440 x 2560	1080 x 1920	1440 x 2560	1080 x 1920	1080 x 1920	1080 x 1920	1080 x 1920	1080 x 1920	1080 x 1920
Pixel density:	577 ppi	515 ppi	401 ppi	538 ppi	373 ppi	401 ppi	375 ppi	367 ppi	401 ppi	424 ppi
Camera resolution:	12MP + 12MP	12MP + 13MP	13MP + 5MP	12MP + 12MP	20MP + 12MP	16MP	16MP	13MP + 13MP	12MP + 2MP	21MP
OIS:	No	No	No	Yes	Yes	No	No	No	No	No
Secondary Camera:	8MP	8MP	13MP	16MP	8MP	20MP + 8MP	20MP + 8MP	8MP	8MP	13MP
Battery Capacity:	2900 mAh	7000 mAh	3000 mAh	4080 mAh	4000 mAh	3050 mAh	4000 mAh	4100 mAh	3340 mAh	3000 mAh
Launched date	Dec-16	Dec-16	Nov-16	Nov-16	Nov-16	Nov-16	Nov-16	Oct-16	Oct-16	Oct-16
Price-USD	-	-	-	-	-	-	-	-	-	-
Price-CNY	CNY3,699	CNY6,999	CNY2,499	CNY 4,498	CNY3,399	CNY2,798	CNY3,450	CNY2,999	CNY999	CNY1,499

## Major dual-cam models in 1Q16-3Q16

	3Q16						2Q16				1Q16
Model	Apple iPhone 7 Plus	Xiaomi Mi 5s Plus	LG V20	LeEco Cool1 dual	Xiaomi Redmi Pro	Huawei Honor 8	Huawei Honor V8	Huawei P9	Huawei P9 Plus	LG G5 SE	LG G5
Model Picture:											
Dimensions (mm):	158.2 x 77.9 x 7.3	154.6 x 77.7 x 8	159.7 x 78.1 x 7.6	152 x 74.8 x 8.2	151.5 x 76.2 x 8.2	145.5 x 71 x 7.5	157 x 77.6 x 7.8	145 x 70.9 x 7	152 x 75.3 x 7	149.4 x 73.9 x 7.3	149.4 x 73.9 x 7.7
Weight:	188 g	168 g	174 g	167 g	174 g	153 g	170 g	144 g	162 g	156 g	159 g
ROM capacity:	32GB	64GB	32/64 GB	32 GB	32 GB	32GB	32GB	32/64GB	64GB	32GB	32GB
RAM capacity:	2 GB	4GB	4 GB	3 GB	3 GB	3 GB	4GB	3/4GB	4GB	3GB	4GB
Display Diagonal:	5.5"	5.7"	5.7"	5.5"	5.5"	5.2"	5.7"	5.2"	5.5"	5.3"	5.3"
Display Resolution (pixels):	1920 x 1080	1080 x 1920	1440 x 2560	1080 x 1920	1080 x 1920	1080 x 1920	1080 x 1920	1080 x 1920	1080 x 1920	1440 x 2560	1440 x 2560
Pixel density:	401 ppi	386 ppi	513 ppi	401 ppi	401 ppi	424 ppi	386 ppi	423 ppi	401 ppi	554 ppi	554 ppi
Camera resolution:	12MP + 12MP	13MP + 13MP	16MP + 8MP	13MP + 13MP	13MP + 5MP	12MP + 12MP	12MP + 12MP	12MP + 12MP	12MP + 12MP	16MP + 8MP	16MP + 8MP
OIS:	Yes (wide angle)	No	Yes	No	No	No	No	No	No	Yes	Yes
Secondary Camera:	7MP	4MP	5MP	8MP	5MP	8MP	8 MP	8MP	8MP	8MP	8MP
Battery Capacity:	Up to 16 days	3800 mAh	3200 mAh	4060 mAh	4050 mAh	3000 mAh	3500 mAh	3000 mAh	3400 mAh	2800 mAh	2800 mAh
Launched date	Sep-16	Sep-16	Sep-16	Aug-16	Jul-16	Jul-16	May-16	Apr-16	Apr-16	Apr-16	Feb-16
Price-USD	USD769	-	USD829	-	-	-	USD430	-	-	USD499	USD629
Price-CNY	-	CNY 2,299	-	CNY1,099	CNY1,499	CNY1,999	CNY2,299	CNY3,188	CNY3,988	-	-

Source: Companies, Daiwa



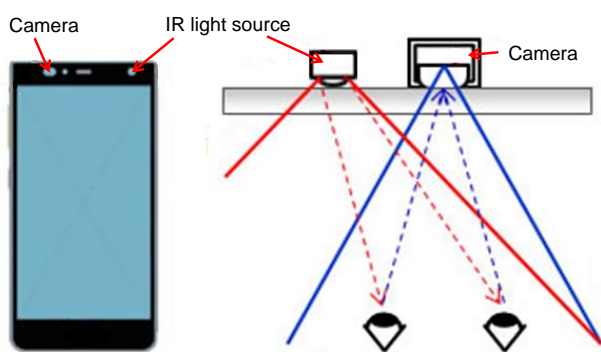
## Further upside from the emergence of biometric ID and 3D sensing

**New features such as biometric ID and 3D sensing should further increase the number of cameras in smartphones and broaden the addressable market for the supply chain**

As highlighted earlier, we see dual-cam adoption as the beginning of a multi-cam adoption trend in smartphones and expect multi-cams/trio-cams to arrive soon, driven by new features (ie, AR/3D) that go beyond image quality enhancement. Indeed, as highlighted in "[Embracing spec upgrade trends for the next iPhones](#)", biometric ID (mostly likely the iris recognition technology) is likely to be adopted in the forthcoming iPhone 8, expected to come out in September 2017. This biometric ID requires an extra front camera to process the iris images.

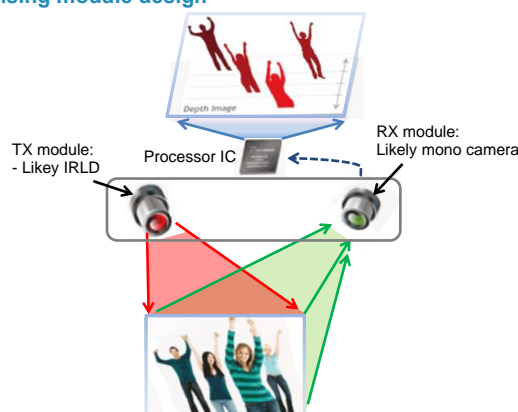
In addition, our recent research suggests that Apple is developing a 3D sensing module, to provide 3D features such as gesture or facial recognition, by leveraging the extra front camera. Although the final specs are not confirmed yet, we expect this trend – adding biometric ID or 3D sensing – to increase the number of cameras in smartphones and further broaden the addressable market for camera components in the long term, given the currently limited penetration in smartphones. In our view, Largan and Sunny Optical are well-positioned to benefit from this trend, but we have not yet factored the upside from the extra cameras from biometric ID or 3D sensing into our earnings forecasts.

### Biometric ID: iris scanner design



Source: Daiwa

### 3D-sensing module design



Source: Daiwa

## Spec upgrades in multi-cams

**The rise of multi-cams should not only provide volume growth drivers, but also ASP upside on back of the upcoming spec upgrades, particularly benefiting the industry leaders – Largan and Sunny**

In our opinion, the rising multi-cam adoption trend will not only provide volume-growth drivers but also add more value to the supply chain. We note that smartphone brands have been upgrading their dual-cam designs to further differentiate themselves by providing better image quality and user experience. The major spec upgrades in dual-cams include a higher megapixel resolution, improved auto-focus speed, increased aperture ratio, the adoption of optical zoom, the inclusion of optical image stabilisation (OIS), etc. Take Apple for example. We expect its new dual-cam iPhones due out this year – iPhone 8 and iPhone 7S plus – to adopt dual OIS with a dual 6P lens set, upgrading from single OIS with 6P/5P lens for iPhone 7 Plus.

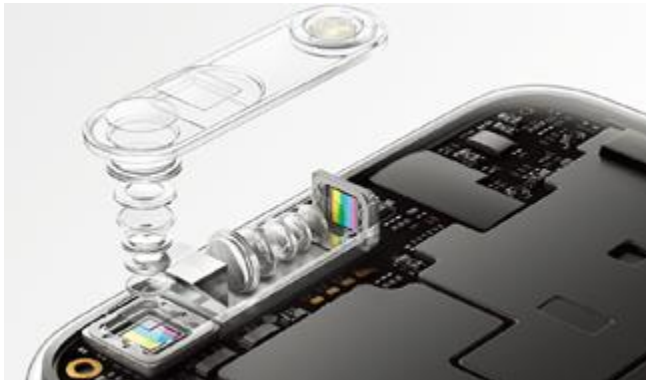
Huawei is also upgrading its dual-cam models with higher megapixels – improving to 20MP + 12MP for the Mate 9 (released in November 2016) from 12MP + 12MP for the P9 in early 2016. In our view, such a spec upgrade trend bodes well for our positive theme for the supply chain, particularly for the leaders, Largan, the leader in high-end lenses, and Sunny Optical, the leader in camera modules.

In addition to these upgrades, our research indicates that smartphone vendors are working on a new folded-lens design, which adopts a periscope arrangement that channels the light by using a prism and gives more space for the lens pack to move physically, allowing a higher multiple zooming capability while minimising the precious horizontal thickness of a smartphone. Oppo demonstrated a dual-cam design with folded lens technology at the

February 2017 Mobile World Congress. This device adopts a periscope style design telephoto camera which is arranged at a 90 degree angle to the accompanying wide angle camera. The device can achieve a 3x optical zoom which is combined with a proprietary image fusion technology for digital zoom. The end result is a total 5x “lossless” zoom factor, as claimed by Oppo. The company targets to apply this technology into its flagship smartphone models in the near future.

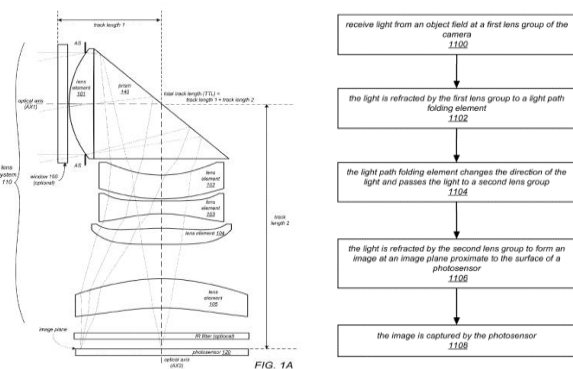
Similarly, Apple’s patent (US 2015/0253647 A1) “the folded camera lens system”, published on 10 September 2015, illustrates a method to use a compact folded-telephoto lens system to achieve a high-resolution optical lens system with a relatively small number of lens elements. The periscope design reduces the bulk and weight of imaging systems in mobile devices while providing a longer and effective focal length, enabling room for higher zooming potential. Although we do not expect the folded design to become mainstream in the near future given the initial high production cost, we view this should provide further earnings upsides for the supply chain, if materialised. We view Largan and Sunny Optical as well-positioned to benefit from this trend, but have not yet factored in these upsides into our estimates.

#### Oppo: dual-cam smartphone with folded lens design to offer 5x optical zoom



Source: Oppo

#### Apple patent: folded camera lens system



Source: Apple

## Positive on the camera component supply chain – valuations and recommendations

**We expect the accelerating dual-cam adoption rate to have a positive impact on the overall camera supply chain; Largan and Sunny Optical remain our top sector picks**

We contend that the rise in the adoption of multiple cameras in smartphones will benefit the camera component supply chain, from upstream CMOS sensors to downstream camera modules, as discussed in [The more the merrier: multi-cameras are the next mega trend in smartphones](#). Based on our recent market research, driven by China brands’ strong interest triggered by the success of iPhone 7 Plus, dual-cam adoption is not only on track but likely to occur more rapidly than we earlier projected. In our view, this accelerated dual-cam adoption bodes well for our positive theme and will have a positive impact on the camera component supply chain. In the Greater China smartphone space, Largan and Sunny Optical remain our top picks under this theme.

Largan stands to benefit from the increasing adoption of dual-cams with its dominant share in the market, given its leading position in the high-end lens market. In addition, new features, such as biometric ID, 3D sensing, and a new client win should provide further upside to its earnings. Given the better earnings outlook, we raise our 2017-18E earnings for Largan by 6-7%. We reaffirm our Buy (1) rating on the stock and raise our 12-month TP to TWD5,600 (from TWD4,800), now based on a target PER of 20x (from 18x), which is near the high point of the stock’s past 5-year range of 8-24x, applied to our revised 2017E EPS.

For Sunny optical, given the faster-than-expected dual-cam adoption trend in China brands, the benefits should come from its handset camera module (on its leading position



in the China brands and the rising trend of biometric ID and 3D sensing) and handset lens sets (owing to the increasing demand for high-end lens and spill-over benefits from SEC adopting the dual-cams from 2H17). In addition, we think the multi-cam adoption also bodes well for its vehicle business on the rising adoption of advanced driver assistance systems (ADAS) in cars. We reaffirm our Buy (1) rating and raise our 12-month target price to HKD61.5 (from HKD44.3), now based on a target PER of 30x (previously: 25x), which is near the high point of its past-3-year trading range of 9-26x, on our revised 2017E EPS. We look for Sunny to be rerated soon given its strong earnings outlook ahead.

## Risks to our view

The primary risk is potentially lower dual-cam adoption. Although we believe dual-cam design adoption will speed up significantly in the next few years given the enhanced image quality from the spec upgrades and the likelihood of biometric ID/3D sensing features being incorporated in smartphones, consumer feedback will likely be the key to the final adoption rate. Poor customer feedback could lead to lower revenue-growth rates for companies focused on camera components, impacting players like Largan and Sunny Optical.

A secondary risk is weaker-than-expected smartphone sell-through. This risk revolves around the uncertainty surrounding macroeconomic events, currency fluctuations, and high smartphone penetration in the developed and developing countries; all these factors could delay the smartphone-replacement cycle or new purchases by consumers. This could result in weaker-than-expected smartphone sell-through and lead to slower-than-expected revenue growth in the sector.

A third risk is an increase in price competition in the sector. After years of strong volume growth, the smartphone market saturation could lead to single digit YoY volume growth in the next few years, based on our forecasts. Limited volume growth could contribute to more intense price competition, ultimately leading to lower gross margins for companies within the sector.

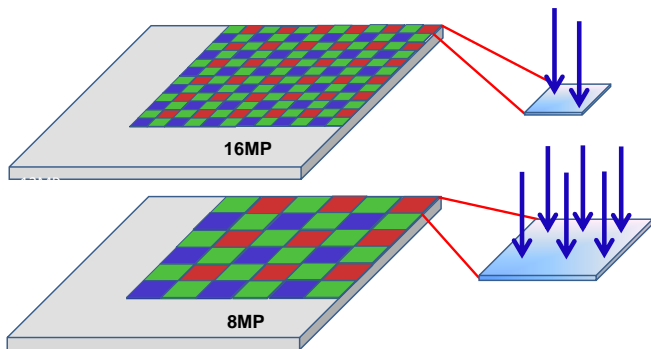
## Appendix 1

### Dilemma: imaging quality vs. form-factor design

Cameras are one of the key features that the brand vendors have been focusing on for upgrades to appeal to consumers. However, the nature of a smartphone's form-factor design, in particular the thickness requirement, has made it a challenge to improve image quality. For instance, a larger CMOS sensor, bigger pixel size, or more lens components in a lens set should allow more light into a camera module to catch more details of a subject, resulting in better image quality. However, this has also meant a bulky camera module with a higher Z-height (the height of the camera module) due to the increased size or pieces of the optical components. Thus, there is always a trade-off between better image quality and a thinner form-factor design for a smartphone.

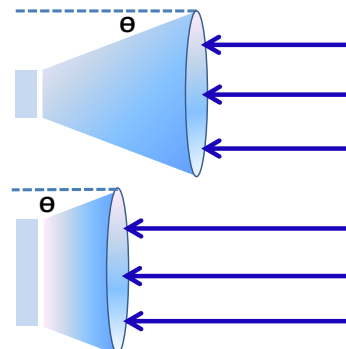
This dilemma became a more important issue with the migration of smartphone cameras to higher resolution. Due to the space constraints in a smartphone, the image quality of 16MP+ camera modules could be worse than that of the phones with 8MP-12MP camera modules, because the pixel size becomes too small to ensure good light sensitivity. On the other hand, assuming other criteria stay the same (such as field of view, sensor size, the level of design difficulty, etc.), higher resolution requires longer focal length due to the smaller pixel size and results in a higher Z-height for the camera module.

The trade-off between light sensitivity and pixel size



Source: Companies, Daiwa

Smaller pixel size results in thicker camera modules

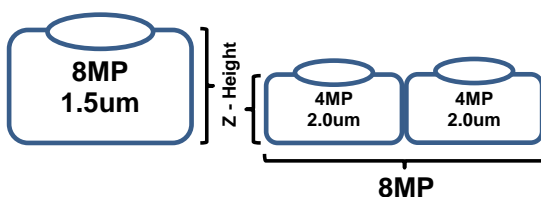


Source: Companies, Daiwa

### Dual-cams as a solution to the dilemma

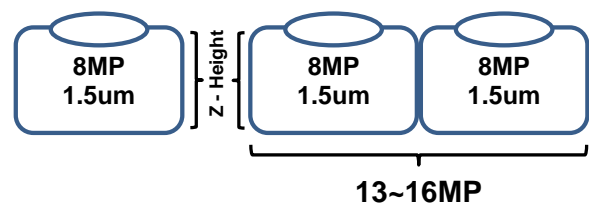
The emergence of dual-cams solves this dilemma, in our view. Having a dual-cam in a smartphone means that it has 2 cameras on the back of the phone to take pictures/shoot film instead of just 1 camera, which is the design currently adopted by most smartphones. By incorporating 2 channels to collect picture details/light, phones with dual-cams can reduce the Z-height significantly and deliver a similar or even better performance than a single-cam. Dual-cam smartphones can offer higher resolution and better image quality compared to single-cam models, and are thinner as well.

Dual-cam design can reduce the thickness of a camera module



Source: Companies, Daiwa  
Note: Z-height: the depth of a camera module

Dual-cam design can improve camera image quality, with a camera module that is as thick, or thin, as a single-camera module



Source: Companies, Daiwa  
Note: Z-height: the depth of a camera module

## Improved imaging quality

In addition to reducing the thickness/height of the camera module to create a thinner form factor for smartphones, dual-cams can improve image quality in different areas by leveraging the different characteristics of each camera. The major benefits of dual-cams include multiple focus/post-shot focus adjustments, a better image quality in low-light environments, improved resolution/pixel quality, optical zoom function, and 3D depth mapping based on different dual-cam designs.

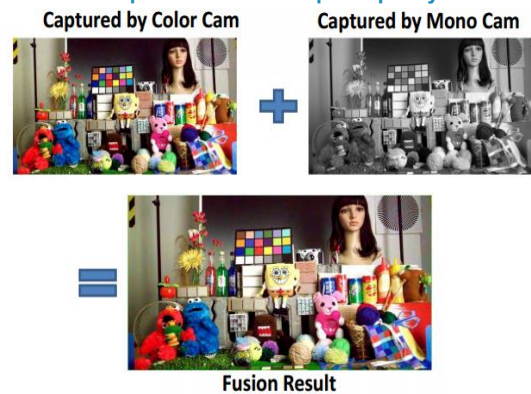
The current dual-cam designs can be categorised into 4 major types: 1) identical type – high resolution (colour) + high resolution (colour), 2) twin type – high resolution (mono) + high resolution (colour), 3) twin type – telephoto camera + wide-angle camera, and 4) depth type – high resolution + low resolution. Each type plays an important role in improving image quality (see the table below).

### Dual camera: multiple focus/post-shot focus adjustments



Source: Corephotonics, Daiwa

### Dual camera: improved resolution/pixel quality



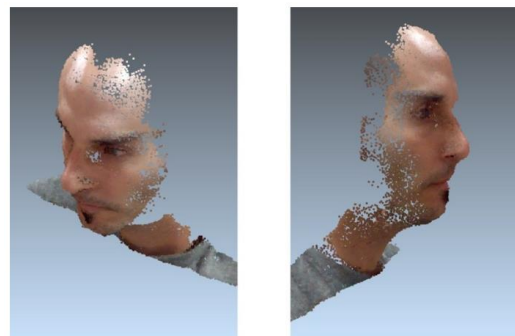
Source: Altek, Daiwa

### Dual camera: optical zoom function



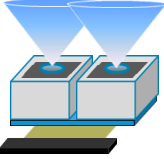
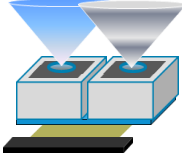
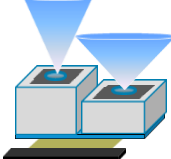
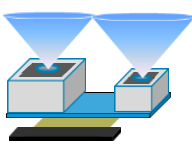
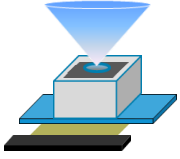
Source: Companies, Daiwa

### Dual camera – 3D depth mapping



Source: Companies, Daiwa

**Image quality and form factor comparisons – different types of dual-cams and single cams**

Structure	Dual-cam Symmetric			Dual-cam Asymmetric	Single camera
Resolution	High + High	High + High	High + High	High + Low	Colour
CMOS sensor	Colour + Colour	Colour + Mono	Colour + Colour	Colour + Colour	Colour
Focal length	Same	Same	Telephoto + Wide-Angle	Depends	
Camera Module Structure					
Thickness of camera module	Thinner	Thinner	Thinner	Thinner	Thicker
Optical zoom	n.a	n.a	★★★★★	★	n.a
Low-light image quality	★★★	★★★★★	★★★★★	★★	★
Improved resolution/ Pixel quality	★★★	★★★★★	★★★★★	★★	★
3D depth mapping	★★★★★	★★★★★	★★★★★	★★★	n.a
Multiple focus / Post-photo adjustments	★★★	★★★	★★★★	★★★★★	★

Source: Companies, Daiwa

# Largan Precision (3008 TT)

 Target price: **TWD5,600** (from TWD4,800)

 Share price (3 Mar): **TWD4,465** | Up/downside: **+25.4%**

 5 4 3 2 **1**  
**Buy**  
 (unchanged)

## Multiple earnings-growth drivers ahead

- EPS should grow by 63% YoY in 2017 on rising dual-cam adoption
- Potential upside from biometric ID, 3D sensing, and likely new client win
- Reiterating Buy (1) rating; raising TP to TWD5,600

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**What's new:** We continue to see Largan as a major beneficiary of rising multi-cam adoption in smartphones. After a 90% share-price rally in the past 1 year, we see further upside being supported by accelerated earnings growth in 2017, driven by favourable industry trends. In addition, we highlight potential upside from the rising camera demand from biometric ID/3D sensing, and a likely new client win in 2018. Hence, we would view any near-term pullback in the low season as an opportunity to accumulate. Reiterating our Buy (1) rating, with a higher TP of TWD5,600. Largan remains one of our top picks in the Greater China smartphone space.

**What's the impact: A major beneficiary of the dual-cam trend.** We raise our forecasts of dual-cam adoption in smartphones in 2017-18E to 255-420m (from 230-390m previously), up from 74m in 2016, driven by the aggressive adoption from China brands, as discussed in the accompanying sector report. We view Largan as a major beneficiary of this development, given its leading position in the high-end lens market. Moreover, our research indicates Largan has an 80%-plus market share in dual-cam lens sets for China brands. In addition to the China brands, we expect Apple to raise its dual-cam adoption for new iPhones to 70% in 2H17 from 36% in 2H16 (see [Embracing spec upgrade trends for the next iPhones](#)), and we expect Largan to remain a major supplier, based on our research in the market. We note also the spec upgrade trend within dual-cams, including higher megapixel counts, better aperture ratios, and the adoption of optical image stabilisation (OIS). For example, we believe Apple's forthcoming dual-cam models will feature dual-OIS and dual 6P lenses, an upgrade from the single OIS and 5P/6P lenses in the iPhone 7Plus. Thus, we believe the rising dual-cam adoption in smartphones will be not only a strong driver of shipment growth but also ASP upside for Largan.

**Further upside ahead: biometric ID, 3D sensing, and a likely new client win.** We expect Apple to adopt an extra front camera for the iPhone 8 to support biometric ID and 3D sensing. If this development eventuates, we believe it could provide 2-4% further earnings upside to our 2017-18E EPS for Largan. Moreover, we believe that Largan is in the running to win orders for Samsung in early 2018, which could provide an additional earnings driver for Largan and further broaden its addressable market. We have not factored this potential upside into our earnings forecasts.

**What we recommend:** We lift 2017-18E EPS by 6-7% on our more upbeat revenue assumptions. We reaffirm our Buy (1) call and raise our 12-month TP to TWD5,600 (from TWD4,800), on a target PER of 20x (from 18x), near the high point of the stock's past-5-year range of 8-24x, applied to our revised 2017E EPS, due to the better earnings outlook. The key risk: weaker-than-expected dual-cam adoption.

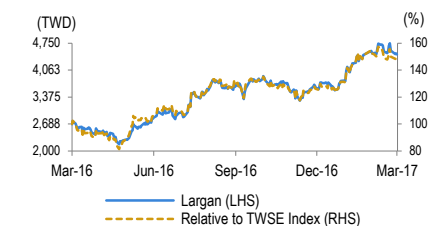
**How we differ:** Our revised 2017-18E EPS are 14-15% above the Bloomberg consensus, likely as we are more upbeat on the benefits from dual-cam adoption in smartphones.

### Forecast revisions (%)

Year to 31 Dec	16E	17E	18E
Revenue change	-	6.1	6.5
Net profit change	-	5.8	6.5
Core EPS (FD) change	-	5.8	6.5

Source: Daiwa forecasts

### Share price performance



12-month range	2,170-4,745
Market cap (USDbn)	19.45
3m avg daily turnover (USDm)	70.01
Shares outstanding (m)	134
Major shareholder	Ch'en Shih Ch'ing (5.0%)

### Financial summary (TWD)

Year to 31 Dec	16E	17E	18E
Revenue (m)	48,352	69,100	82,750
Operating profit (m)	27,915	43,913	53,742
Net profit (m)	22,722	36,981	45,462
Core EPS (fully-diluted)	169.392	275.689	338.916
EPS change (%)	(5.9)	62.8	22.9
Daiwa vs Cons. EPS (%)	0.0	13.7	15.1
PER (x)	26.4	16.2	13.2
Dividend yield (%)	1.4	1.3	2.2
DPS	63.0	59.3	96.5
PBR (x)	7.7	5.6	4.3
EV/EBITDA (x)	19.5	12.0	9.3
ROE (%)	32.2	40.1	37.0

Source: FactSet, Daiwa forecasts

## Financial summary

### Key assumptions

Year to 31 Dec	2011	2012	2013	2014	2015	2016E	2017E	2018E
Mobile phone lens shipment ('000 units)	286,554	344,730	539,156	869,054	998,771	868,579	1,089,209	1,265,777
Blended ASP of handset lens (USD)	1.33	1.34	1.35	1.47	1.47	1.60	1.98	2.06
Gross margin of VCM assembly (%)	6.8	5.3	6.0	7.4	8.4	7.5	7.5	7.5

### Profit and loss (TWDm)

Year to 31 Dec	2011	2012	2013	2014	2015	2016E	2017E	2018E
Mobile Phone Lens Revenues	11,300	13,647	21,615	38,140	45,970	44,061	67,930	82,297
VCM Asembly Revenue	3,943	5,543	5,268	7,370	9,781	4,055	1,018	263
Other Revenue	742	882	550	301	118	236	152	190
<b>Total Revenue</b>	<b>15,984</b>	<b>20,072</b>	<b>27,433</b>	<b>45,810</b>	<b>55,869</b>	<b>48,352</b>	<b>69,100</b>	<b>82,750</b>
Other income	0	0	0	0	0	0	0	0
COGS	(9,043)	(11,710)	(14,472)	(21,291)	(23,812)	(15,914)	(19,120)	(22,223)
SG&A	(506)	(530)	(887)	(1,349)	(1,817)	(1,867)	(2,504)	(2,800)
Other op.expenses	(963)	(1,034)	(1,293)	(2,103)	(2,585)	(2,656)	(3,563)	(3,985)
<b>Operating profit</b>	<b>5,472</b>	<b>6,798</b>	<b>10,781</b>	<b>21,067</b>	<b>27,655</b>	<b>27,915</b>	<b>43,913</b>	<b>53,742</b>
Net-interest inc./(exp.)	50	84	122	250	349	455	544	707
Assoc/forex/extraord./others	314	(71)	598	1,646	1,156	(130)	206	457
<b>Pre-tax profit</b>	<b>5,837</b>	<b>6,811</b>	<b>11,501</b>	<b>22,963</b>	<b>29,160</b>	<b>28,241</b>	<b>44,663</b>	<b>54,906</b>
Tax	(638)	(1,234)	(1,891)	(3,525)	(5,003)	(5,518)	(7,682)	(9,444)
Min. int./pref. div./others	0	0	0	0	0	0	0	0
<b>Net profit (reported)</b>	<b>5,199</b>	<b>5,578</b>	<b>9,610</b>	<b>19,438</b>	<b>24,157</b>	<b>22,722</b>	<b>36,981</b>	<b>45,462</b>
<b>Net profit (adjusted)</b>	<b>5,199</b>	<b>5,578</b>	<b>9,610</b>	<b>19,438</b>	<b>24,157</b>	<b>22,722</b>	<b>36,981</b>	<b>45,462</b>
<b>EPS (reported)(TWD)</b>	<b>38.755</b>	<b>41.581</b>	<b>71.640</b>	<b>144.909</b>	<b>180.084</b>	<b>169.392</b>	<b>275.689</b>	<b>338.916</b>
<b>EPS (adjusted)(TWD)</b>	<b>38.755</b>	<b>41.581</b>	<b>71.640</b>	<b>144.909</b>	<b>180.084</b>	<b>169.392</b>	<b>275.689</b>	<b>338.916</b>
<b>EPS (adjusted fully-diluted)(TWD)</b>	<b>38.755</b>	<b>41.581</b>	<b>71.640</b>	<b>144.909</b>	<b>180.084</b>	<b>169.392</b>	<b>275.689</b>	<b>338.916</b>
<b>DPS (TWD)</b>	<b>13.500</b>	<b>17.000</b>	<b>17.000</b>	<b>28.500</b>	<b>51.000</b>	<b>63.030</b>	<b>59.287</b>	<b>96.491</b>
<b>EBIT</b>	<b>5,472</b>	<b>6,798</b>	<b>10,781</b>	<b>21,067</b>	<b>27,655</b>	<b>27,915</b>	<b>43,913</b>	<b>53,742</b>
<b>EBITDA</b>	<b>6,372</b>	<b>8,005</b>	<b>12,229</b>	<b>22,728</b>	<b>29,495</b>	<b>27,915</b>	<b>43,913</b>	<b>53,742</b>

### Cash flow (TWDm)

Year to 31 Dec	2011	2012	2013	2014	2015	2016E	2017E	2018E
Profit before tax	5,837	6,811	11,501	22,963	29,160	28,241	44,663	54,906
Depreciation and amortisation	900	1,208	1,448	1,661	1,841	2,056	2,529	3,001
Tax paid	(638)	(1,234)	(1,891)	(3,525)	(5,003)	(5,518)	(7,682)	(9,444)
Change in working capital	1,202	(783)	(363)	(920)	7,411	(1,677)	(10,706)	(3,456)
Other operational CF items	18	(2)	51	(32)	6	(5)	(6)	(7)
<b>Cash flow from operations</b>	<b>7,318</b>	<b>6,000</b>	<b>10,746</b>	<b>20,147</b>	<b>33,414</b>	<b>23,097</b>	<b>28,797</b>	<b>45,001</b>
Capex	(3,149)	(2,865)	(1,504)	(5,568)	(8,213)	(4,500)	(4,500)	(4,500)
Net (acquisitions)/disposals	(2)	(101)	9	194	(0)	(10)	(10)	(10)
Other investing CF items	(23)	(19)	(1,593)	(695)	125	(1,234)	0	0
<b>Cash flow from investing</b>	<b>(3,173)</b>	<b>(2,985)</b>	<b>(3,088)</b>	<b>(6,069)</b>	<b>(8,089)</b>	<b>(5,744)</b>	<b>(4,510)</b>	<b>(4,510)</b>
Change in debt	319	(356)	12	108	(32)	(80)	0	0
Net share issues/(repurchases)	0	0	0	0	0	0	0	0
Dividends paid	(1,811)	(2,280)	(2,280)	(3,823)	(6,841)	(8,455)	(7,953)	(12,943)
Other financing CF items	37	(43)	51	138	(127)	0	0	0
<b>Cash flow from financing</b>	<b>(1,456)</b>	<b>(2,679)</b>	<b>(2,217)</b>	<b>(3,577)</b>	<b>(7,000)</b>	<b>(8,535)</b>	<b>(7,953)</b>	<b>(12,943)</b>
Forex effect/others	0	0	0	0	0	0	0	0
<b>Change in cash</b>	<b>2,690</b>	<b>336</b>	<b>5,440</b>	<b>10,501</b>	<b>18,325</b>	<b>8,818</b>	<b>16,335</b>	<b>27,548</b>
Free cash flow	4,169	3,136	9,242	14,579	25,201	18,597	24,297	40,501

Source: FactSet, Daiwa forecasts



## Financial summary continued ...

### Balance sheet (TWDm)

As at 31 Dec	2011	2012	2013	2014	2015	2016E	2017E	2018E
Cash & short-term investment	11,268	11,604	17,045	27,546	45,871	54,688	71,023	98,570
Inventory	1,461	2,532	2,693	3,538	3,730	2,652	3,824	4,445
Accounts receivable	3,510	6,581	6,823	13,338	11,537	12,585	17,985	21,538
Other current assets	234	255	248	388	363	345	494	591
<b>Total current assets</b>	<b>16,473</b>	<b>20,973</b>	<b>26,809</b>	<b>44,809</b>	<b>61,500</b>	<b>70,271</b>	<b>93,325</b>	<b>125,144</b>
Fixed assets	8,057	9,731	9,800	13,722	20,115	22,558	24,530	26,028
Goodwill & intangibles	0	0	0	0	0	0	0	0
Other non-current assets	379	485	2,004	2,523	2,372	3,621	3,637	3,654
<b>Total assets</b>	<b>24,909</b>	<b>31,188</b>	<b>38,614</b>	<b>61,054</b>	<b>83,987</b>	<b>96,450</b>	<b>121,492</b>	<b>154,825</b>
Short-term debt	444	93	83	190	157	100	100	100
Accounts payable	1,358	3,555	2,507	4,999	2,864	2,529	3,143	3,653
Other current liabilities	3,243	4,426	5,507	9,594	17,506	16,117	11,517	11,821
<b>Total current liabilities</b>	<b>5,045</b>	<b>8,075</b>	<b>8,097</b>	<b>14,783</b>	<b>20,527</b>	<b>18,746</b>	<b>14,760</b>	<b>15,574</b>
Long-term debt	0	0	0	0	0	0	0	0
Other non-current liabilities	54	49	71	72	73	50	50	50
<b>Total liabilities</b>	<b>5,099</b>	<b>8,124</b>	<b>8,168</b>	<b>14,855</b>	<b>20,600</b>	<b>18,796</b>	<b>14,810</b>	<b>15,624</b>
Share capital	1,341	1,341	1,341	1,341	1,341	1,341	1,341	1,341
Reserves/R.E./others	18,469	21,723	29,104	44,857	62,045	76,312	105,340	137,859
<b>Shareholders' equity</b>	<b>19,810</b>	<b>23,064</b>	<b>30,445</b>	<b>46,198</b>	<b>63,386</b>	<b>77,654</b>	<b>106,682</b>	<b>139,201</b>
Minority interests	0	0	0	0	0	0	0	0
<b>Total equity &amp; liabilities</b>	<b>24,909</b>	<b>31,188</b>	<b>38,614</b>	<b>61,054</b>	<b>83,987</b>	<b>96,450</b>	<b>121,492</b>	<b>154,825</b>
EV	588,112	587,425	581,974	571,580	553,223	544,348	528,013	500,466
<b>Net debt/(cash)</b>	<b>(10,824)</b>	<b>(11,511)</b>	<b>(16,962)</b>	<b>(27,356)</b>	<b>(45,713)</b>	<b>(54,588)</b>	<b>(70,923)</b>	<b>(98,470)</b>
<b>BVPS (TWD)</b>	<b>147.685</b>	<b>171.943</b>	<b>226.965</b>	<b>344.402</b>	<b>472.538</b>	<b>578.900</b>	<b>795.301</b>	<b>1,037.726</b>

### Key ratios (%)

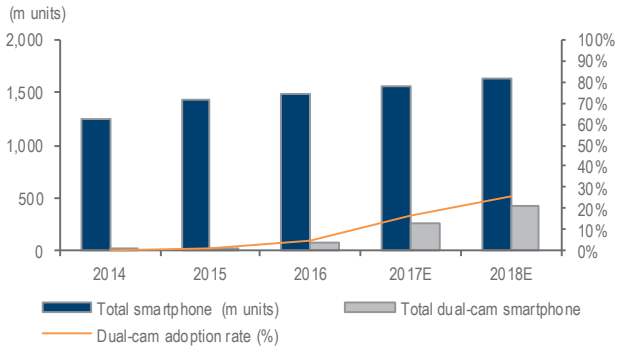
Year to 31 Dec	2011	2012	2013	2014	2015	2016E	2017E	2018E
Sales (YoY)	29.4	25.6	36.7	67.0	22.0	(13.5)	42.9	19.8
EBITDA (YoY)	18.0	25.6	52.8	85.9	29.8	(5.4)	57.3	22.4
Operating profit (YoY)	17.4	24.2	58.6	95.4	31.3	0.9	57.3	22.4
Net profit (YoY)	28.5	7.3	72.3	102.3	24.3	(5.9)	62.8	22.9
Core EPS (fully-diluted) (YoY)	28.5	7.3	72.3	102.3	24.3	(5.9)	62.8	22.9
Gross-profit margin	43.4	41.7	47.2	53.5	57.4	67.1	72.3	73.1
EBITDA margin	39.9	39.9	44.6	49.6	52.8	57.7	63.6	64.9
Operating-profit margin	34.2	33.9	39.3	46.0	49.5	57.7	63.6	64.9
Net profit margin	32.5	27.8	35.0	42.4	43.2	47.0	53.5	54.9
ROAE	28.7	26.0	35.9	50.7	44.1	32.2	40.1	37.0
ROAA	23.7	19.9	27.5	39.0	33.3	25.2	33.9	32.9
ROCE	29.8	31.3	40.2	54.8	50.3	39.5	47.6	43.7
ROIC	57.7	54.2	72.0	110.3	125.5	110.3	123.6	116.4
Net debt to equity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Effective tax rate	10.9	18.1	16.4	15.4	17.2	19.5	17.2	17.2
Accounts receivable (days)	76.4	91.7	89.2	80.3	81.3	91.0	80.7	87.2
Current ratio (x)	3.3	2.6	3.3	3.0	3.0	3.7	6.3	8.0
Net interest cover (x)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Net dividend payout	34.8	40.9	23.7	19.7	28.3	37.2	21.5	28.5
Free cash flow yield	0.7	0.5	1.5	2.4	4.2	3.1	4.1	6.8

Source: FactSet, Daiwa forecasts

## Company profile

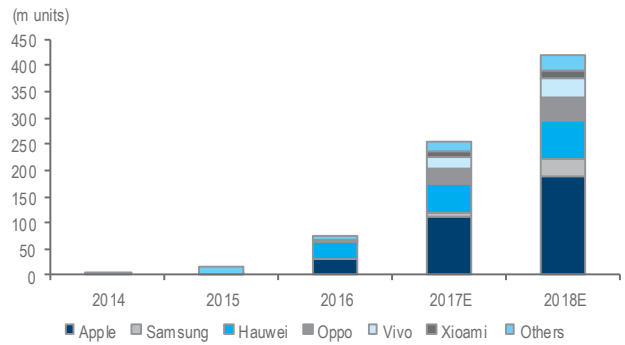
In Asia ex-Japan, Largan Precision is the leading lens manufacturer for mobile handsets. Nokia, Motorola, Sony Ericsson, Apple, HTC, and Blackberry are the company's major customers. It currently has about a 28% share of the global handset-lens market.

**Dual-cam penetration in smartphones in 2014-18E**



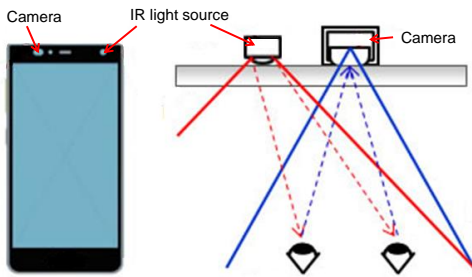
Source: Daiwa estimates and forecasts

**Dual-cam adoption in smartphones by brands 2014-18E**



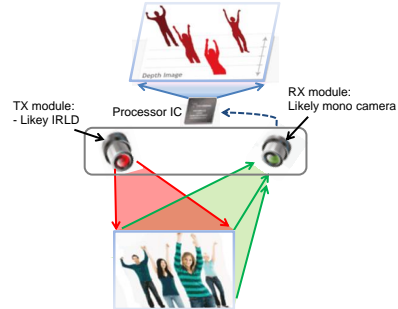
Source: Daiwa estimates and forecasts

**Biometric ID: iris scanner design**



Source: Daiwa

**3D sensing module design**



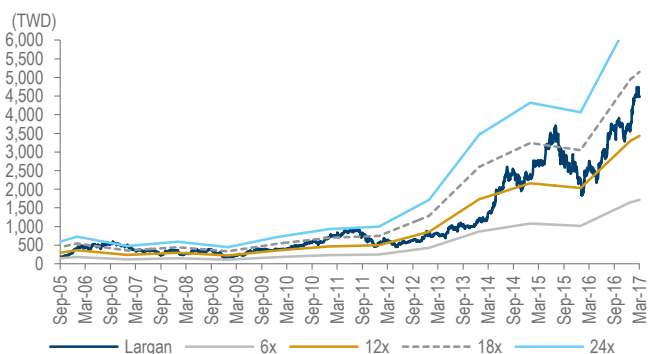
Source: Daiwa

**Largan: quarterly and annual P&L statements**

(TWDm)	2016				2017E				2016	2017E	2018E
	1Q	2Q	3Q	4Q	1QE	2QE	3QE	4QE			
<b>Net sales</b>	8,271	10,044	14,315	15,722	11,610	14,740	19,073	23,677	48,352	69,100	82,750
<b>Gross profit</b>	4,936	6,666	9,728	11,109	8,011	10,627	13,713	17,628	32,438	49,980	60,527
Operating costs	751	876	1,363	1,532	1,062	1,238	1,656	2,111	4,523	6,067	6,786
<b>Operating profit</b>	4,185	5,790	8,365	9,576	6,949	9,390	12,057	15,517	27,915	43,913	53,742
Pre-tax income	4,219	6,009	8,084	9,928	7,019	9,560	12,277	15,807	28,241	44,663	54,906
<b>Net income</b>	3,623	3,690	6,961	8,449	6,036	6,596	10,558	13,790	22,722	36,981	45,462
<b>Net EPS (TWD)</b>	27.0	27.5	51.9	63.0	45.0	49.2	78.7	102.8	169.4	275.7	338.9
<b>Operating ratios</b>											
Gross margin	59.7%	66.4%	68.0%	70.7%	69.0%	72.1%	71.9%	74.5%	67.1%	72.3%	73.1%
Operating margin	50.6%	57.6%	58.4%	60.9%	59.9%	63.7%	63.2%	65.5%	57.7%	63.6%	64.9%
Pre-tax margin	51.0%	59.8%	56.5%	63.1%	60.5%	64.9%	64.4%	66.8%	58.4%	64.6%	66.4%
Net margin	43.8%	36.7%	48.6%	53.7%	52.0%	44.8%	55.4%	58.2%	47.0%	53.5%	54.9%
<b>YoY (%)</b>											
Net revenue	-22%	-27%	-11%	2%	40%	47%	33%	51%	-13%	43%	20%
Gross profit	-18%	-16%	10%	20%	62%	59%	41%	59%	1%	54%	21%
Operating income	-19%	-19%	13%	20%	66%	62%	44%	62%	1%	57%	22%
Net income	-18%	-24%	-15%	26%	67%	79%	52%	63%	-6%	63%	23%
<b>QoQ (%)</b>											
Net revenue	-46%	21%	43%	10%	-26%	27%	29%	24%			
Gross profit	-47%	35%	46%	14%	-28%	33%	29%	29%			
Operating income	-47%	38%	44%	14%	-27%	35%	28%	29%			
Net income	-46%	2%	89%	21%	-29%	9%	60%	31%			

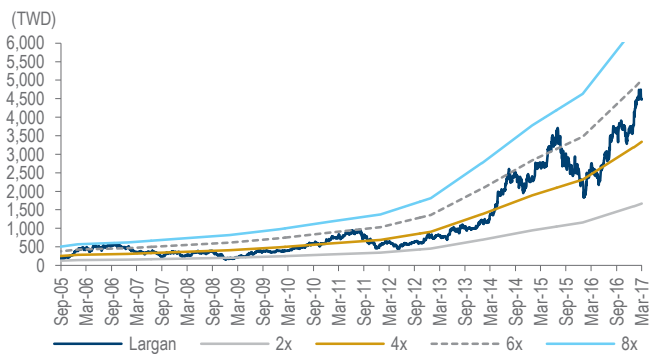
Source: Company, Daiwa forecasts

**Largan: 1-year-forward PER**



Source: Company, Daiwa forecasts

**Largan: 1-year-forward PBR**



Source: Company, Daiwa forecasts

# Sunny Optical Technology (2382 HK)

 Target price: **HKD61.50** (from HKD44.30)

 Share price (3 Mar): **HKD51.05** | Up/downside: **+20.5%**

 5 4 3 2 **1**

**Buy**  
 (unchanged)

## Robust earnings outlook on favourable industry trends

- Embracing the dual-cam boom in China
- We forecast 30-53% YoY 2017-18 EPS growth on favourable trends
- Reiterating Buy (1) rating; raising TP to HKD61.5 from HKD44.3

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**What's new:** We continue to view Sunny Optical (Sunny) as a major beneficiary of the rising adoption of multi-cams in smartphones. Despite a share price rally of 50% YTD, likely driven by market recognition that Sunny is a beneficiary of increased dual-cam adoption (see [Solid earnings outlook; pullback a good entry point](#), 4 November), we see further upside from faster-than-expected dual-cam adoption by China smartphone brands and the emergence of new features such as biometric authentication and 3D sensing. Sunny remains one of our top picks in the Greater China smartphone space, and hence we would view any near-term pullback in the low season as an opportunity to accumulate. Reiterating Buy (1) and lifting TP to HKD61.50.

**What's the impact: Benefiting from the dual-cam boom in China.** We raise our smartphone dual-cam adoption forecast in 2017-18E to 255-420m (from 230-390m), driven by the aggressive uptake from China brands, as discussed in the accompanying sector report. We view Sunny as a key beneficiary of this trend, given its leading position in handset camera modules (HCM) in China. In addition to Huawei, our research suggests Oppo and Vivo are aggressively adopting dual-cams in 2017. In total, we forecast China dual-cam adoption in smartphones to rise to 130m in 2017E, from 38m in 2016 and 5m in 2015. Driven by an improved product mix and dual-cam adoption, we forecast HCM revenue to grow by 23-36% YoY in 2017-18E. In addition, the rising trend of biometric ID and 3D sensing should be a new opportunity for Sunny if China smartphone brands adopt the technology. For handset lens sets (HLS), we expect Sunny's revenue to grow by 28-31% YoY in 2017-18E on increased overall market demand due to the rise of dual-cams. Also, there could be further upside if, as we expect, Samsung, a major customer, adopts dual cams in 2H17.

**Strong earnings growth on favourable industry trends.** We believe Sunny is set to benefit from emerging opportunities due to its comprehensive product offering. In addition to the multi-cam handset trend, its vehicle business is benefiting from the multi-cam trend on rising adoption of advanced driver assistance systems (ADAS) in cars. In total, we forecast Sunny's earnings to grow by 30-53% YoY for 2017-18E, with ROE rising to 34% in 2018E, from 21% in 2015.

**What we recommend:** We raise our 2016-18E earnings by 5-19% to factor in our increased smartphone dual-cam adoption forecasts. We reiterate our Buy (1) rating and raise our 12-month TP to HKD61.5 (from HKD44.3), based on a 30x PER (25x previously) on our revised 2017E EPS (vs. the past 3-year trading range of 9-26x). We believe Sunny merits a rerating given its strong earnings outlook. Key risk: worse-than-expected ASP pressure.

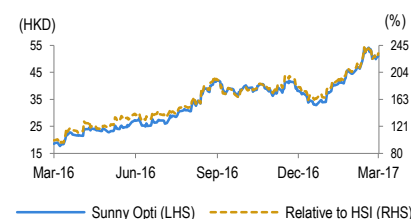
**How we differ:** Our 2017-18E EPS are 9-10% above the Bloomberg consensus, likely as we are more upbeat on the benefits from dual-cam adoption in smartphones.

### Forecast revisions (%)

Year to 31 Dec	16E	17E	18E
Revenue change	5.9	15.1	15.4
Net profit change	5.1	19.2	17.5
Core EPS (FD) change	5.1	19.2	17.5

Source: Daiwa forecasts

### Share price performance



12-month range	17.64-54.15
Market cap (USDbn)	7.08
3m avg daily turnover (USDm)	37.19
Shares outstanding (m)	1,077
Major shareholder	Sun Xu Ltd (38.4%)

### Financial summary (CNY)

Year to 31 Dec	16E	17E	18E
Revenue (m)	14,830	19,750	24,160
Operating profit (m)	1,387	2,151	2,815
Net profit (m)	1,241	1,902	2,472
Core EPS (fully-diluted)	1.153	1.766	2.295
EPS change (%)	62.6	53.2	29.9
Daiwa vs Cons. EPS (%)	2.2	10.3	9.2
PER (x)	39.4	25.7	19.8
Dividend yield (%)	0.5	0.8	1.2
DPS	0.207	0.346	0.530
PBR (x)	10.0	7.6	5.9
EV/EBITDA (x)	27.9	18.2	13.7
ROE (%)	28.5	33.8	33.7

Source: FactSet, Daiwa forecasts

## Financial summary

### Key assumptions

Year to 31 Dec	2011	2012	2013	2014	2015	2016E	2017E	2018E
Handset CCM shipment (m units)	70	97	133	187	228	270	312	353
Blended ASP of handset CCM (USD)	2.38	3.78	4.98	5.68	5.25	6.04	7.11	7.73
Vehicle lens shipment (m units)	0	0	8	11	17	23	32	45
Handset lens shipment (m units)	32	36	26	75	302	379	468	553

### Profit and loss (CNYm)

Year to 31 Dec	2011	2012	2013	2014	2015	2016E	2017E	2018E
Handset CCM Revenues	1,069	2,307	4,157	6,576	7,785	10,927	14,872	18,259
Vehicle Lens Revenues	100	167	291	421	651	894	1,309	1,897
Other Revenue	1,329	1,510	1,365	1,429	2,260	3,009	3,568	4,004
<b>Total Revenue</b>	<b>2,499</b>	<b>3,984</b>	<b>5,813</b>	<b>8,426</b>	<b>10,696</b>	<b>14,830</b>	<b>19,750</b>	<b>24,160</b>
Other income	0	0	0	0	0	0	0	0
COGS	(1,976)	(3,243)	(4,846)	(7,137)	(8,933)	(12,250)	(16,128)	(19,570)
SG&A	(182)	(214)	(254)	(320)	(352)	(478)	(559)	(657)
Other op.expenses	(131)	(163)	(251)	(392)	(502)	(716)	(912)	(1,119)
<b>Operating profit</b>	<b>210</b>	<b>363</b>	<b>462</b>	<b>577</b>	<b>909</b>	<b>1,387</b>	<b>2,151</b>	<b>2,815</b>
Net-interest inc./exp.)	(3)	(3)	(7)	(14)	(16)	(21)	(22)	(22)
Assoc/forex/extraord./others	33	37	49	71	(31)	85	90	90
<b>Pre-tax profit</b>	<b>240</b>	<b>397</b>	<b>504</b>	<b>634</b>	<b>862</b>	<b>1,451</b>	<b>2,219</b>	<b>2,883</b>
Tax	(38)	(58)	(64)	(73)	(99)	(207)	(315)	(409)
Min. int./pref. div./others	14	7	(0)	5	(2)	(2)	(2)	(2)
<b>Net profit (reported)</b>	<b>215</b>	<b>346</b>	<b>440</b>	<b>566</b>	<b>762</b>	<b>1,241</b>	<b>1,902</b>	<b>2,472</b>
<b>Net profit (adjusted)</b>	<b>215</b>	<b>346</b>	<b>440</b>	<b>566</b>	<b>762</b>	<b>1,241</b>	<b>1,902</b>	<b>2,472</b>
<b>EPS (reported)(CNY)</b>	<b>0.223</b>	<b>0.360</b>	<b>0.443</b>	<b>0.529</b>	<b>0.709</b>	<b>1.153</b>	<b>1.766</b>	<b>2.295</b>
<b>EPS (adjusted)(CNY)</b>	<b>0.223</b>	<b>0.360</b>	<b>0.443</b>	<b>0.529</b>	<b>0.709</b>	<b>1.153</b>	<b>1.766</b>	<b>2.295</b>
<b>EPS (adjusted fully-diluted)(CNY)</b>	<b>0.223</b>	<b>0.360</b>	<b>0.443</b>	<b>0.529</b>	<b>0.709</b>	<b>1.153</b>	<b>1.766</b>	<b>2.295</b>
<b>DPS (CNY)</b>	<b>0.044</b>	<b>0.071</b>	<b>0.102</b>	<b>0.112</b>	<b>0.154</b>	<b>0.207</b>	<b>0.346</b>	<b>0.530</b>
<b>EBIT</b>	<b>210</b>	<b>363</b>	<b>462</b>	<b>577</b>	<b>909</b>	<b>1,387</b>	<b>2,151</b>	<b>2,815</b>
<b>EBITDA</b>	<b>298</b>	<b>472</b>	<b>609</b>	<b>792</b>	<b>1,155</b>	<b>1,699</b>	<b>2,578</b>	<b>3,336</b>

### Cash flow (CNYm)

Year to 31 Dec	2011	2012	2013	2014	2015	2016E	2017E	2018E
Profit before tax	240	397	504	634	862	1,451	2,219	2,883
Depreciation and amortisation	88	109	147	215	246	312	427	521
Tax paid	(38)	(58)	(64)	(73)	(99)	(207)	(315)	(409)
Change in working capital	(264)	(169)	55	(898)	609	(372)	(769)	(637)
Other operational CF items	14	7	(0)	5	(2)	(2)	(2)	(2)
<b>Cash flow from operations</b>	<b>40</b>	<b>286</b>	<b>643</b>	<b>(117)</b>	<b>1,616</b>	<b>1,182</b>	<b>1,560</b>	<b>2,356</b>
Capex	(112)	(265)	(286)	(465)	(351)	(850)	(700)	(700)
Net (acquisitions)/disposals	1	13	1	(62)	(64)	0	0	0
Other investing CF items	0	(38)	(26)	(178)	(60)	60	0	0
<b>Cash flow from investing</b>	<b>(111)</b>	<b>(291)</b>	<b>(311)</b>	<b>(705)</b>	<b>(475)</b>	<b>(790)</b>	<b>(700)</b>	<b>(700)</b>
Change in debt	(35)	34	392	56	167	(5)	0	0
Net share issues/(repurchases)	0	0	0	0	0	0	0	0
Dividends paid	(43)	(69)	(101)	(120)	(166)	(223)	(372)	(571)
Other financing CF items	(20)	(27)	589	(55)	(2)	0	0	0
<b>Cash flow from financing</b>	<b>(97)</b>	<b>(61)</b>	<b>879</b>	<b>(120)</b>	<b>(0)</b>	<b>(229)</b>	<b>(372)</b>	<b>(571)</b>
Forex effect/others	0	0	0	0	0	0	0	0
<b>Change in cash</b>	<b>(169)</b>	<b>(66)</b>	<b>1,211</b>	<b>(942)</b>	<b>1,141</b>	<b>163</b>	<b>488</b>	<b>1,086</b>
Free cash flow	(73)	20	357	(582)	1,265	332	860	1,656

Source: FactSet, Daiwa forecasts

## Financial summary continued ...

### Balance sheet (CNYm)

As at 31 Dec	2011	2012	2013	2014	2015	2016E	2017E	2018E
Cash & short-term investment	681	614	1,826	884	2,025	2,188	2,675	3,761
Inventory	472	748	768	896	897	1,441	1,967	2,509
Accounts receivable	627	901	1,172	2,388	3,003	3,657	4,870	5,957
Other current assets	42	4	1	36	93	129	180	242
<b>Total current assets</b>	<b>1,822</b>	<b>2,267</b>	<b>3,766</b>	<b>4,204</b>	<b>6,017</b>	<b>7,414</b>	<b>9,692</b>	<b>12,469</b>
Fixed assets	489	646	785	1,035	1,141	1,679	1,952	2,131
Goodwill & intangibles	0	0	0	0	0	0	0	0
Other non-current assets	64	89	114	354	478	418	418	418
<b>Total assets</b>	<b>2,375</b>	<b>3,002</b>	<b>4,665</b>	<b>5,594</b>	<b>7,636</b>	<b>9,512</b>	<b>12,062</b>	<b>15,018</b>
Short-term debt	62	103	489	522	683	684	684	684
Accounts payable	599	939	1,257	1,744	2,914	3,859	4,860	5,898
Other current liabilities	9	11	36	31	142	59	79	97
<b>Total current liabilities</b>	<b>671</b>	<b>1,052</b>	<b>1,782</b>	<b>2,297</b>	<b>3,739</b>	<b>4,603</b>	<b>5,623</b>	<b>6,678</b>
Long-term debt	17	0	18	36	33	36	36	36
Other non-current liabilities	7	18	6	11	19	10	10	10
<b>Total liabilities</b>	<b>694</b>	<b>1,070</b>	<b>1,805</b>	<b>2,343</b>	<b>3,791</b>	<b>4,649</b>	<b>5,669</b>	<b>6,724</b>
Share capital	98	98	105	105	105	105	105	105
Reserves/R.E./others	1,584	1,834	2,755	3,145	3,740	4,758	6,287	8,188
<b>Shareholders' equity</b>	<b>1,681</b>	<b>1,932</b>	<b>2,860</b>	<b>3,251</b>	<b>3,845</b>	<b>4,863</b>	<b>6,392</b>	<b>8,293</b>
Minority interests	0	0	0	0	0	0	0	0
<b>Total equity &amp; liabilities</b>	<b>2,375</b>	<b>3,002</b>	<b>4,665</b>	<b>5,594</b>	<b>7,636</b>	<b>9,512</b>	<b>12,062</b>	<b>15,018</b>
EV	48,256	48,346	47,538	48,531	47,549	47,390	46,902	45,816
<b>Net debt/(cash)</b>	<b>(601)</b>	<b>(512)</b>	<b>(1,319)</b>	<b>(327)</b>	<b>(1,309)</b>	<b>(1,468)</b>	<b>(1,955)</b>	<b>(3,041)</b>
<b>BVPS (CNY)</b>	<b>1.741</b>	<b>2.007</b>	<b>2.876</b>	<b>3.038</b>	<b>3.579</b>	<b>4.515</b>	<b>5.935</b>	<b>7.701</b>

### Key ratios (%)

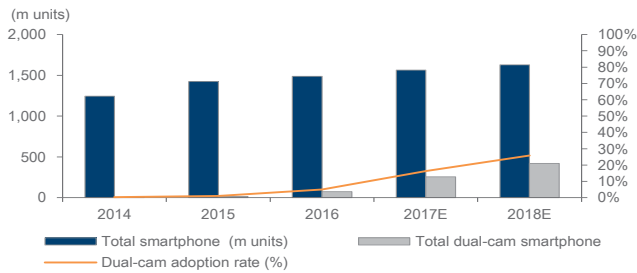
Year to 31 Dec	2011	2012	2013	2014	2015	2016E	2017E	2018E
Sales (YoY)	37.4	59.5	45.9	45.0	26.9	38.6	33.2	22.3
EBITDA (YoY)	30.3	58.1	29.1	30.0	45.9	47.1	51.7	29.4
Operating profit (YoY)	48.0	73.0	27.1	24.9	57.6	52.5	55.1	30.9
Net profit (YoY)	49.7	60.8	27.2	28.5	34.5	63.0	53.2	29.9
Core EPS (fully-diluted) (YoY)	51.7	61.3	23.1	19.4	34.0	62.6	53.2	29.9
Gross-profit margin	20.9	18.6	16.6	15.3	16.5	17.4	18.3	19.0
EBITDA margin	11.9	11.8	10.5	9.4	10.8	11.5	13.1	13.8
Operating-profit margin	8.4	9.1	7.9	6.8	8.5	9.4	10.9	11.7
Net profit margin	8.6	8.7	7.6	6.7	7.1	8.4	9.6	10.2
ROAE	13.4	19.2	18.4	18.5	21.5	28.5	33.8	33.7
ROAA	9.7	12.9	11.5	11.0	11.5	14.5	17.6	18.3
ROCE	12.3	19.1	17.1	16.1	21.7	27.3	33.9	34.9
ROIC	18.9	24.8	27.3	22.9	29.5	40.1	47.1	49.8
Net debt to equity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Effective tax rate	15.8	14.7	12.6	11.5	11.5	14.3	14.2	14.2
Accounts receivable (days)	79.0	70.0	65.1	77.1	92.0	82.0	78.8	81.8
Current ratio (x)	2.7	2.2	2.1	1.8	1.6	1.6	1.7	1.9
Net interest cover (x)	70.4	115.7	70.0	41.3	56.8	66.6	99.6	130.3
Net dividend payout	19.8	19.8	22.9	21.3	21.8	18.0	19.6	23.1
Free cash flow yield	n.a.	0.0	0.7	n.a.	2.6	0.7	1.8	3.4

Source: FactSet, Daiwa forecasts

## Company profile

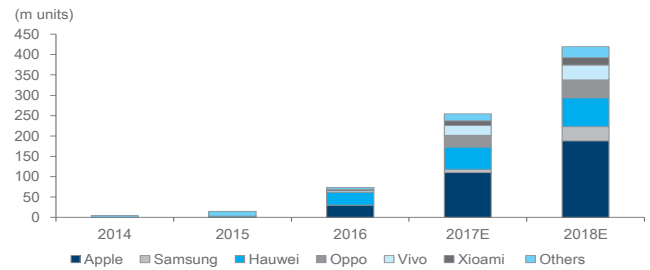
Founded in 1984, Sunny Optical is the leading optical component manufacturer in the China technology supply chain. It develops and provides optical-related products with various applications, including instruments, components and opto-electronic modules. The company's major customers include leading China smartphone brand name makers Huawei, Lenovo and OPPO.

**Dual-cam penetration in smartphones**



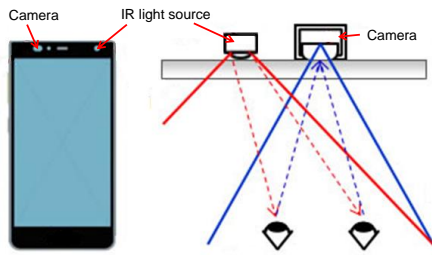
Source: Daiwa estimates and forecasts

**Dual-cam adoption by smartphone brands**



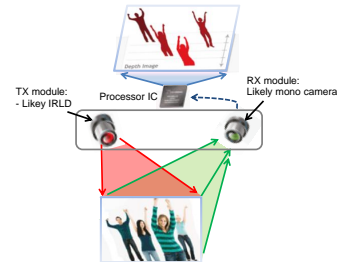
Source: Daiwa estimates and forecasts

**Biometric ID: Iris scanner design**



Source: Daiwa

**3D sensing module design**



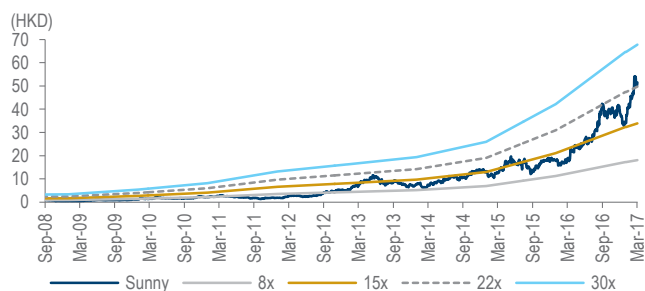
Source: Daiwa

**Sunny Optical: semi-annual and annual P&L statement**

(CNYm)	2016E		2017E		2016E	2017E	2018E
	1H	2HE	1HE	2HE			
<b>Net sales</b>	5,910	8,920	9,046	10,704	14,830	19,750	24,160
COGS	4,922	7,328	7,467	8,661	12,250	16,128	19,570
<b>Gross profit</b>	<b>988</b>	<b>1,592</b>	<b>1,578</b>	<b>2,044</b>	<b>2,580</b>	<b>3,622</b>	<b>4,590</b>
Operating costs	485	709	706	765	1,194	1,471	1,776
<b>Operating profit</b>	<b>503</b>	<b>883</b>	<b>872</b>	<b>1,279</b>	<b>1,387</b>	<b>2,151</b>	<b>2,815</b>
Pre-tax income	552	896	892	1,325	1,449	2,217	2,881
<b>Net income</b>	<b>465</b>	<b>776</b>	<b>763</b>	<b>1,139</b>	<b>1,241</b>	<b>1,902</b>	<b>2,472</b>
<b>Net EPS (CNY)</b>	<b>0.43</b>	<b>0.72</b>	<b>0.71</b>	<b>1.06</b>	<b>1.15</b>	<b>1.77</b>	<b>2.29</b>
<b>Operating ratios</b>							
Gross margin	16.7%	17.9%	17.5%	19.1%	17.4%	18.3%	19.0%
Operating margin	8.5%	9.9%	9.6%	11.9%	9.4%	10.9%	11.7%
Pre-tax margin	9.3%	10.0%	9.9%	12.4%	9.8%	11.2%	11.9%
Net margin	7.9%	8.7%	8.4%	10.6%	8.4%	9.6%	10.2%
<b>YoY (%)</b>							
Net revenue	27%	48%	53%	20%	39%	33%	22%
Gross profit	37%	53%	60%	28%	46%	40%	27%
Operating income	56%	51%	73%	45%	52%	55%	31%
Pre-tax income	58%	75%	61%	48%	68%	53%	30%
Net income	51%	71%	64%	47%	63%	53%	30%
<b>HoH (%)</b>							
Net revenue	-2%	51%	1%	18%			
Gross profit	-5%	61%	-1%	29%			
Operating income	-14%	75%	-1%	47%			
Pre-tax income	8%	62%	0%	48%			
Net income	2%	67%	-2%	49%			

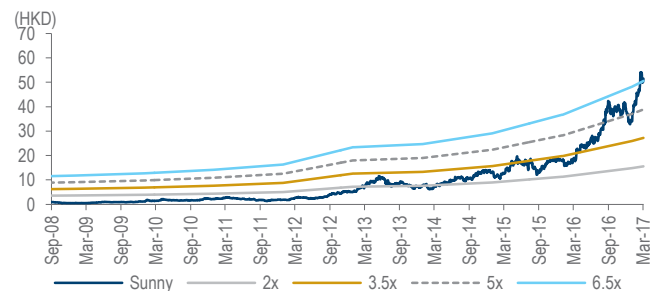
Source: Company, Daiwa forecasts

**Sunny Optical: 1-year-forward PER**



Source: Bloomberg, Daiwa forecasts

**Sunny Optical: 1-year-forward PBR**



Source: Bloomberg, Daiwa forecasts



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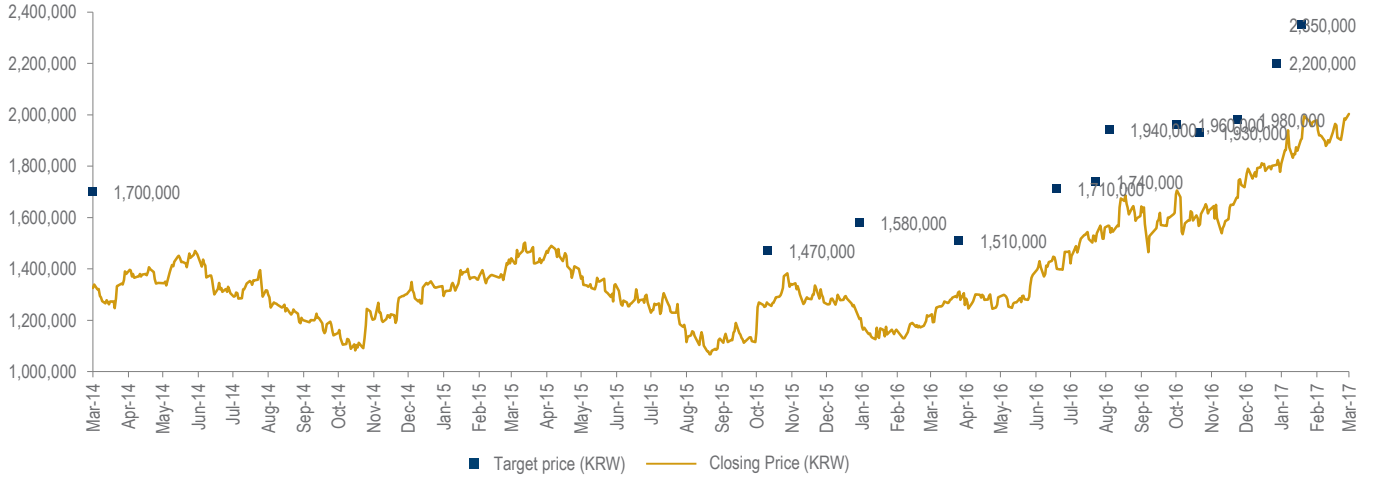
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**Samsung Electronics: share price and Daiwa recommendation trend**

Date	Target price	Rating	Date	Target price	Rating	Date	Target price	Rating
16/10/15	1,470,000	Buy	28/07/16	1,740,000	Buy	29/11/16	1,980,000	Buy
31/12/15	1,580,000	Buy	09/08/16	1,940,000	Buy	30/12/16	2,200,000	Buy
31/03/16	1,510,000	Buy	07/10/16	1,960,000	Buy	24/01/17	2,350,000	Buy
24/06/16	1,710,000	Buy	27/10/16	1,930,000	Buy			



Source: Daiwa

Note: where appropriate, historical target prices have been adjusted to reflect the current share count

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**Disclosure of investment ratings**

Rating	Percentage of total
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Source: Daiwa

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