



CrucialTec

First Mover Leading Total Input Solution

*(*As of May. 31, 2017)*

The Only One-stop Fingerprint Solution Provider _ PKG & Coating, Algorithm, IC

Company & Fingerprint Solution

❖ Crucialtec

- The Only One-stop Fingerprint Solution Provider
- Supplied BTP to global major smartphone vendors as below,
 - LG, Huawei, Google, Fujitsu, OPPO, Meizu, Vivo, Sony...etc.
 - Many projects with various vendors beside above in process

BTP(Biometric TrackPad) : Mobile Fingerprint Solution



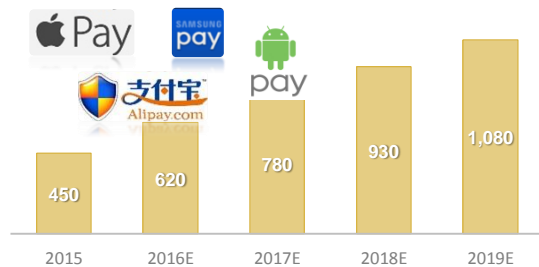
❖ Fingerprint Solution

Better Security & Convenience



Growth of Mobile Payment

<Total Revenue of Global Mobile Payment Market>

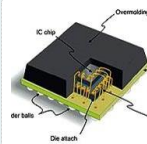


(unit: USD bn / Source: TrendForce)

One-stop Solution Provider

❖ Global market leader

- One-stop Fingerprint Solution (PKG & Coating, Algo, IC)
- 300 M units of OTP(Optical Trackpad) and 100M units of BTP mass production experience with Global Handset makers Possession of 400 intellectual properties



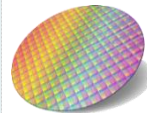
Packaging, Coating

- High Recognition, Customized Design for Customer
- Coating (Material/Thickness/Hardness/Esthetics)
- Various Materials (Tempered Glass, Ceramic, UV)



Algorithm

- Algorithm for ultra small area size
- Fast and accurate authentication with Low CPU
- Over 10 million algorithm supply experience



IC

- Create optimized solutions (PKG, Coating, Algo, IC) by IC characteristics
- Under co-developing with IC suppliers at our IC Lab
- Launched co-developed IC with IDEX in 2Q, Plan to launch own IC in 2017



(200 Members) FIDO (Fast Identity Online)

- Bio Authentication Global Consortium
- CrucialTec, One of the Fido Board Level members
- BioPay solution acquired standard of all Fido sectors



Capacity

- Monthly 12M, Annually 144M
- Established Vietnam Plants (Cost Competitiveness↑)

First Mover Advantage

❖ BTP Adopted Major

- 17 Customers / Around 89 Models



G6 (Feb'17)



Pixel (Oct'16)



NOVA (Sep'16)



Xperia XZ (Feb' 17)



MOTO Z Play(Sep'16)



M6, M6+(Sep'16)

❖ BTP Customers (17 Customers)



❖ New BTP Line



Under Glass BTP

- BTP under glass without any button
- > Mass production in this year



Anti-Fake BTP

- Detecting fake finger by heart rate + Fingerprint
- > Mass production in this year



DFS (Display Fingerprint Solution)

- Fingerprint Authentication on touch screen
- > Under development

Contents

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2. Plants & Capacity

Business

1. **BTP** ★
2. MFM & PG

Finance

1. Business Performance
2. Revenue Analysis

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2. Financial Statements

Disclaimers

This material has been prepared by Crucialtec Co., Ltd. solely for the reader's information. The 2017 business performances and forward-looking statements reflect Crucialtec's current views with respect to future events and financial performance, and are subject to certain risks and uncertainties, and some of which are beyond the company's control and are difficult to predict. Therefore actual outcomes and results may differ materially from what is expressed or forecasted in such forward-looking statements. The readers should not place undue reliance on those forward-looking statements. Crucialtec undertakes no obligation to update any forward-looking statements to reflect subsequent events.

Company

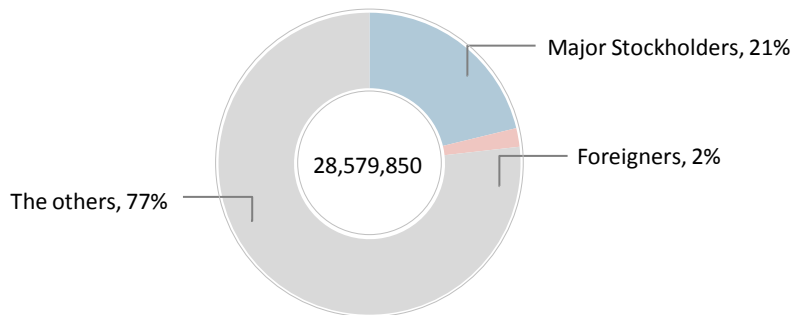
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Global Input Device No.1, Your Crucial Partner, Crucialtec

Company Overview

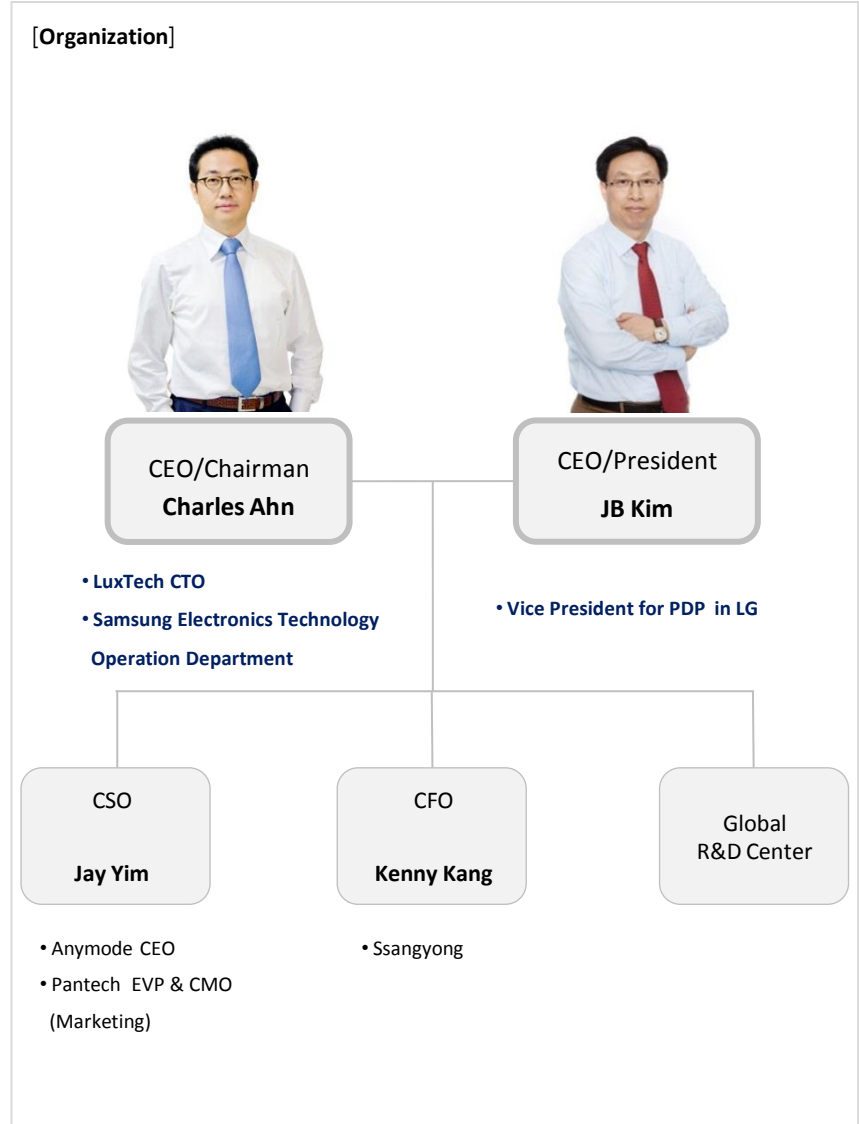
CEO	Charles Ahn, JB Kim
Established	April 20, 2001
Share Outstanding	28,579,850
Industry	Electronic Components Manufacturing
Major Products	Mobile Trackpad, Mobile Touch Solution, Mobile Flash Module
Employee	1300 (R&D staffs 200, Sales & Admin staffs 100, Manufacture staffs 1,000)
Address	<ul style="list-style-type: none"> • [Headquarters] CrucialTec, 62, Pangyo-ro 255beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea • [Korea Plant] 20, #79 Hoseo-ro, Baebang-eup, Asan-si, Chungcheongnam-do, South Korea • [Cruciatec VINA] Yen Phong Industrial Zone, Long Chau, Yen Phong District, Bac Ninh Province, Vietnam • [SamwooEMS Headquarters] 77-20, Seongseogongdanbuk-ro, Dalseo-gu, Daegu, Korea • [SamwooEMS China] No.17, Xeda Shiji Road, Xiqing Economic Development Zone, Tianjin, China

Shareholder Structure



*2017, May

Board of Directors



Production Line in Vietnam & China, Supply System for Global Customers

World wide network



Capacity

(Unit : m/month)

		Monthly	Yearly
BTP(OTP)	Vietnam(Hanoi)	10M	120M
	China(Tianjin)	2M	24M
	Total	12M	144M

<Vietnam Plant>

- CrucialTec VINA, acquired High-Tech Certification(OTP 2012 / BTP 2014)
 - Corporate tax exemption for 4 years and 50% of tax reduction for 9 years / VAT and Duty exemption
- Move pre-process of BTP(Semiconductor Packaging) to Vietnam
 - Improve cost competitiveness as labor & distribution costs reduction

<China Plant>

- Set up BTP production line in Tianjin, Strengthen the relationship of Chinese customers
 - Supply of sample, strategy model, urgent order
 - Rapid response for quality issue

Business

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OTP & BTP

BTP (Biometric TrackPad)

**Subminiature Mobile Fingerprint Solution
(OTP + Fingerprint Verification Technology)**



**Provide Customized function, material, design & solution
to various global customers**



Various Functions



Reference Models



OTP (Optical TrackPad)

Subminiature Mobile Input Solution like PC mouse



Accurate select & input on small screen, Touch screen supplement

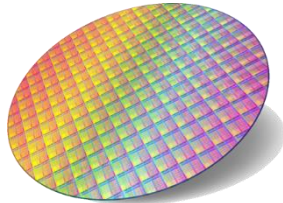


BTP Total Solution

BTP Total Solution Providing



IC



- IC Design, Production

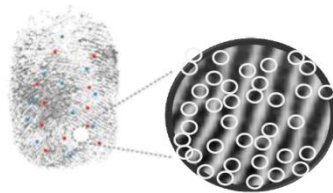
- IC chip size Miniaturization
- Patent issues Avoidance

★ CT competitiveness

- Secure cost competitiveness by IC diversification
- Supplying co-developed IC with IDEX from 2Q16
- Supplied over 5M to global customers



Algorithm Framework



- Extract feature from fingerprint image and process data

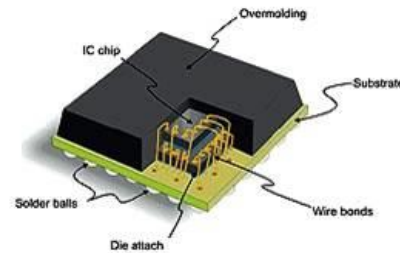
- Rapid recognition even ultra small size of sensor area with low CPU

★ CT competitiveness

- Ultra small size of area for algorithm
- Supplied over 10M units of BTP algorithm



Module PKG



Design > CSP > Coating > Bezel

- Ultra Small BTP Modularization

- High recognition rate, Customizing design
- **Coating Technology**(material, thickness & hardness, color consistency)
- Various Material(Glass, Ceramic, UV)

★ CT competitiveness

- 300M of OTP and 80M of BTP mass production experience with global handset makers
- Stable yield compared to competitors
- > Higher GP Margin



Global Customers



Smartphone with fingerprint module



★ BTP Major Model



[Google] Pixel



[SONY] Xperia XZ



[Huawei] P9



[Huawei] NOVA



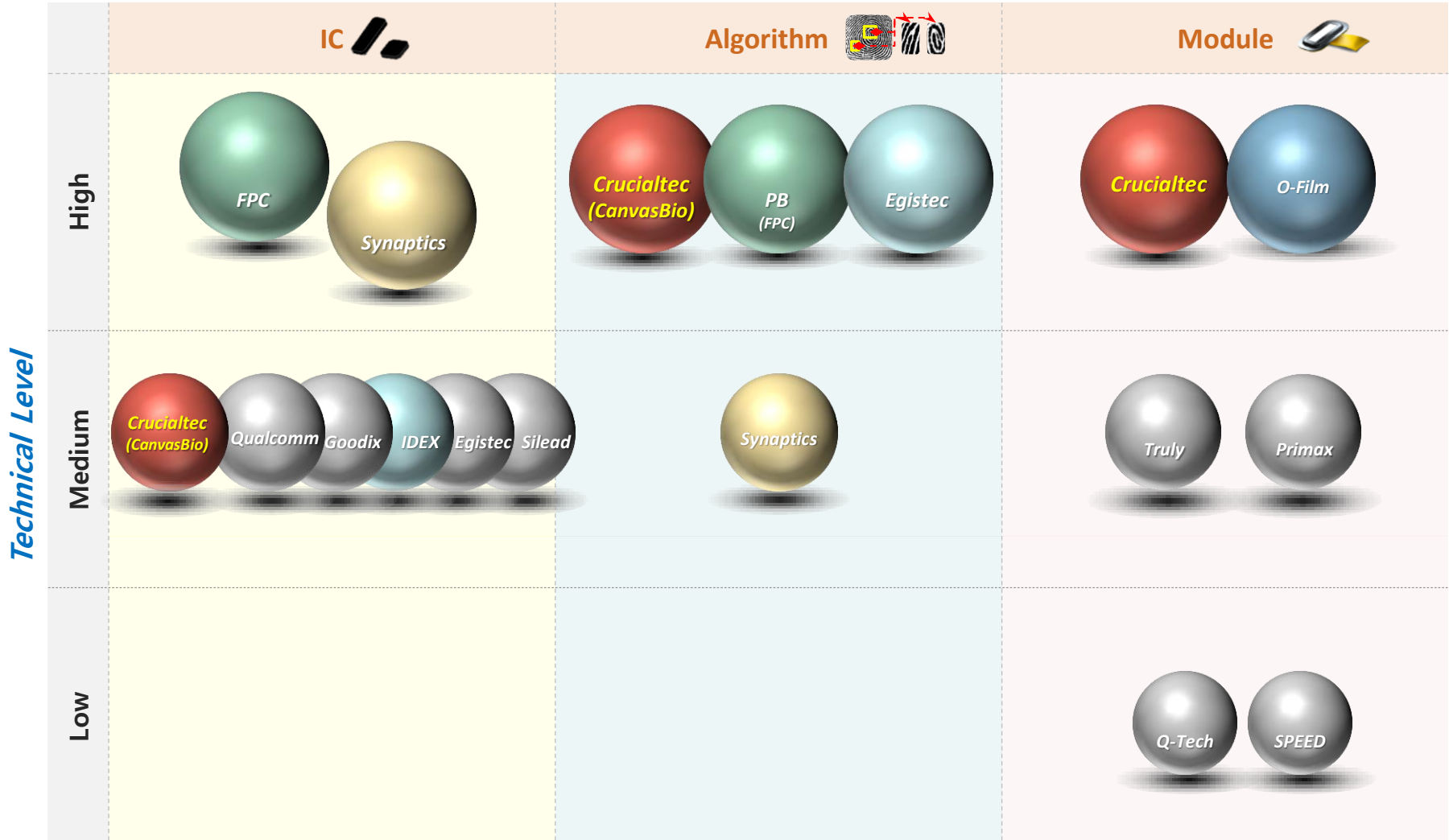
[LG] G6



[lenovo] MOTO Z Play

Competitive Composition

Technical Sector



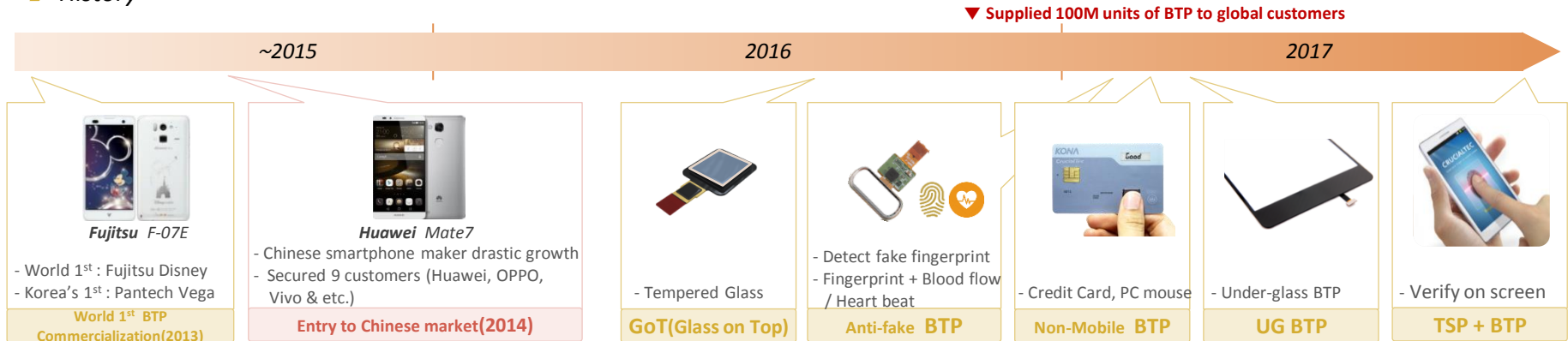
[FPC(Fingerprint Cards), PB(Precise Biometrics)]

Module

Customizing BTP Modularization – Size, Design, Material



History

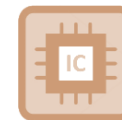


Strong points of BTP Module

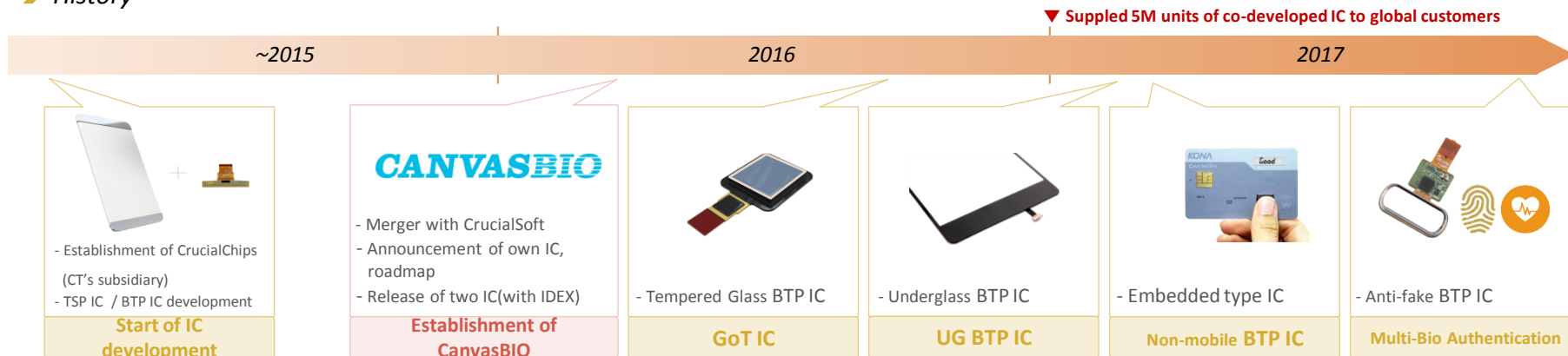
<p>Ultra Small</p> <p>Module Size for Mobile</p> <ul style="list-style-type: none"> - Possess technology of ultra small module for mobile -> Available to be mounted on small mobile devise -> Possible to adopt BTP to front, back & side of Smartphone 	<p>Customized design</p> <p>Various Customers Request</p> <ul style="list-style-type: none"> - Supply customized BTP by various customer's request -> Manufacture diverse size, shape, color BTP -> Coating with various materials such as UV, ceramic, tempered glass
<p>Mass-Produce System</p> <p>Global Plants</p> <ul style="list-style-type: none"> - Build production line abroad -> Build BTP line in Hanoi, Vietnam(10mn/m) and Tianjin, China(2mn/m) -> Move pre-process of BTP to Vietnam and operated by SamwooEMS VINA - Mass production -> 300M units of OTP, 80M units of BTP 	<p>Additional functions</p> <p>New Fingerprint Module</p> <ul style="list-style-type: none"> - Multi-Bio Authentication -> Anti-Fake Solution(Fingerprint + Heart beat): Detecting fake fingerprint -> Add additional function on BTP: Hear beat, vein, blood flow, body heat and etc. - Shine (LED Lighting), Waterproof

IC

Enhance BTP Total Solution Capability by CanvasBio IC Development



History



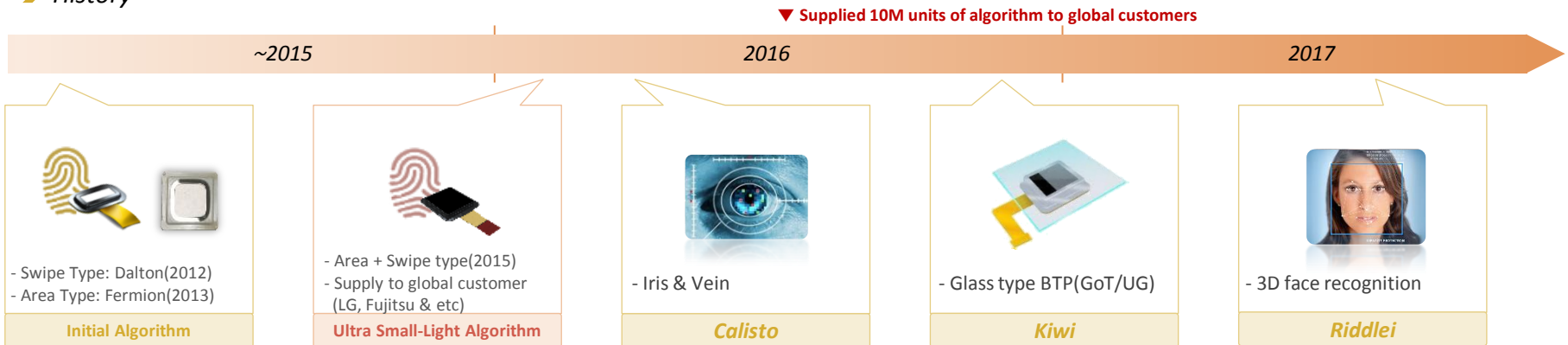
Why CT&CB Develop IC?



Algorithm

Muon – The World Smallest Sensor Area with Ultra Light-weight Fingerprint Algorithm

> History



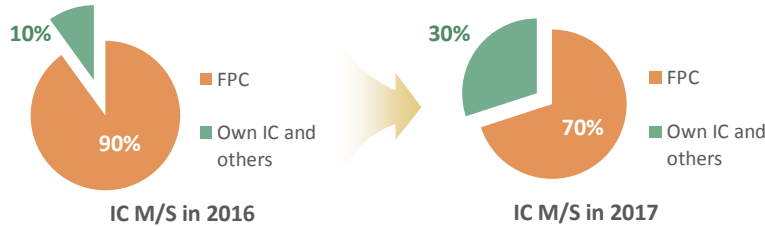
> Strong points of **Muon**

 Ultra Small The World Smallest Area for Fingerprint Matching - Ultra small area for fingerprint matching -> Fingerprint verification on the world smallest size(18.72mm ²) (1/3 smaller area compare to existing sensor size) -> Possible to be adopted (home key, back key, side key)	 Light-weight Ultra Light-weight Algorithm - Minimization of fingerprint template capacity, Verification with Low CPU -> Template capacity for 1 finger: 4Kb -> Fingerprint verification with CPU of IoT home appliances
 Safe Maximum Use of Trustzone - Maximum use of Trustzone -> CT : Capture & Extract features of finger image and store template in the Trustzone -> Others : Only store template in the Trustzone (Low speed issue) *Trustzone : Physically separate to memory card & Safer from hackers	 Fast & Accurate Fast & Accurate Fingerprint Verification - Shorter & Quicker response time when fingerprint verification -> within 0.3 seconds (fast & accurate fingerprint matching despite at the Trustzone) -> FAR (False Acceptance Rate): 0.001% / FRR (False Rejection Rate): 1%

Strategy for 2017

2017 New Leap with One-stop Solution / Production Line / New product

IC Diversity (Own IC)



Enhance IC Competitiveness

- IC market competition & Customer request -> IC Diversity
 - Own IC design, production
 - New IC (Goodix, Silead, Qualcomm and etc.) test
- ▶ **Cost reduction of BTP**

SCM Localization



Cost reduction / Improve Customer Responsiveness

- Secure competitiveness -> SCM Localization
 - Move chip packaging line to Vietnam
 - Set up new BTP production line in Tianjin, China
- ▶ **Cost reduction(Lead time of production, labor & distribution cost reduction) and Productivity improvement**
- ▶ **Chinese customer responsiveness improvement**

New Product



Anti-Fake BTP

Under-Glass BTP

Smart Card

Lead Market with Advanced Technology

- Market Leading via BTP differentiation -> New Product Development
 - > Completed new BTP such as Anti-fake, UG BTP
 - > Extend BTP adoption to non-mobile product such as credit card, PC mouse, remote control and etc.
- ▶ **Lead fingerprint market by new materials, advanced technology and high security**

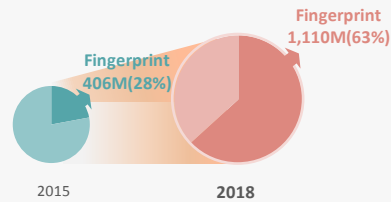
Mid-Long term Strategy

EXISTING

Mobile



Fingerprint module shipments



(M Units)	2015(M/S)	2018(M/S)
Global smartphone	1,433	1,755
Global fingerprint module	406(28%)	1,110(63%)

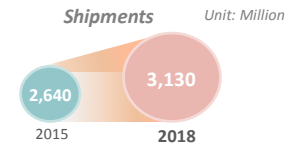
- Applied to 89 models with 17 customers
- Global No.1 One-stop Fingerprint Solution Provider

NEW

Smart Card



- User Identification Payment
- Credit Card, Access Card



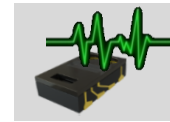
PC & Wearable



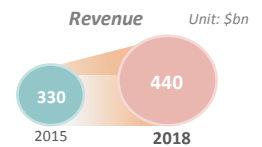
- Online Payment
- PC Mouse, Wearable



Healthcare

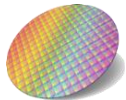


- Medical / Smart Healthcare
- Jeonju Bio Medical Lab.
- Co-develop Body Diagnostic Device with TAMU(Texas A&M University)



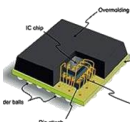
INDUSTRY

Fingerprint recognition



IC

- Launch own IC in this year (via CanvasBio)
- Co-Develop IC with several IC suppliers



Coating & Packaging

- Customized design for each mobile customer
- Diversify coating materials (Tempered Glass, Ceramic)



Algorithm

- Fast and accurate ultra small algorithm
- Experience of supplying Over 10million algorithm

TECH

Bio Pay



Payment Solution

- Convenient & safe user verification solution
- FIDO board member / Certificated all parts of FIDO UAF

Bio Security



Complex Biometric Authentication

- Fingerprint + Iris / HeartRate / Vein
- TSP Integrated Solution (FP + TSP)

Bio Healthcare



Healthcare Solution

- Biorhythms Analysis
- Prevent & Diagnosis of a disease

● MFM(Mobile Flash Module) Solution

Mobile Flash module + PL(Flash Window Lens)



Mobile Flash Module - Luminance Improvement, Heat-sink Tech



Flash Window Lens - Good Light Distribution



➤ **Applied Models**



[Samsung] Galaxy series [Samsung] Galaxy Tab serie [LG] G2 [Gionee] T1

● PG(Patterned Glass)

Various patterns and colors on glass with higher transmittance



Transmittance	★★★★★ 90~92%
Thickness	★★★★★ Glass + 0.02t
Pattern Hardness	★★★★★ Over 7H




➤ **Applied Models**

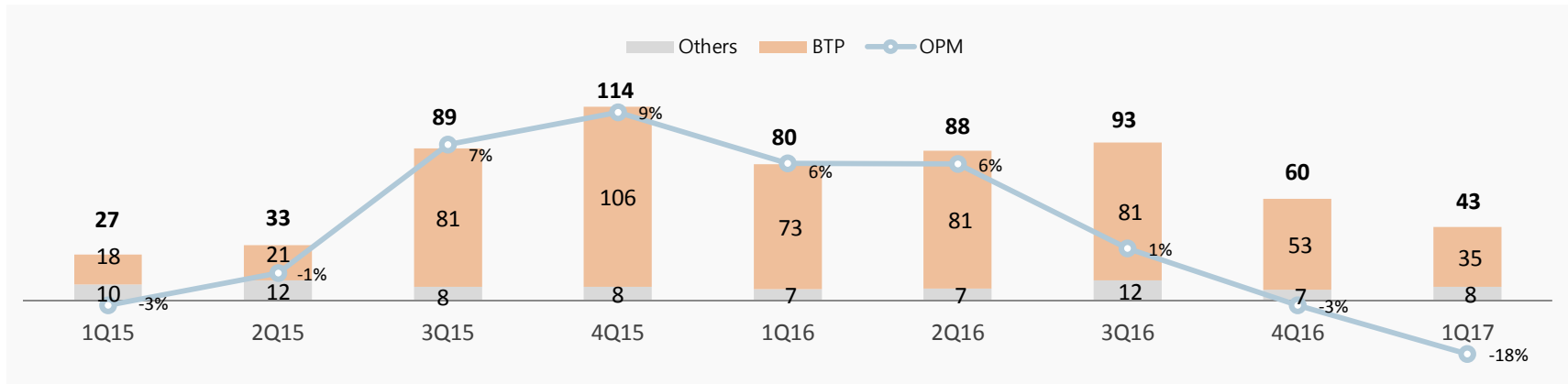


[Samsung] Galaxy S7 Camera Window [iriver] Astell & Kern Junior Cover Glass [iriver] Astell & Kern 320 Cover Glass

Financial

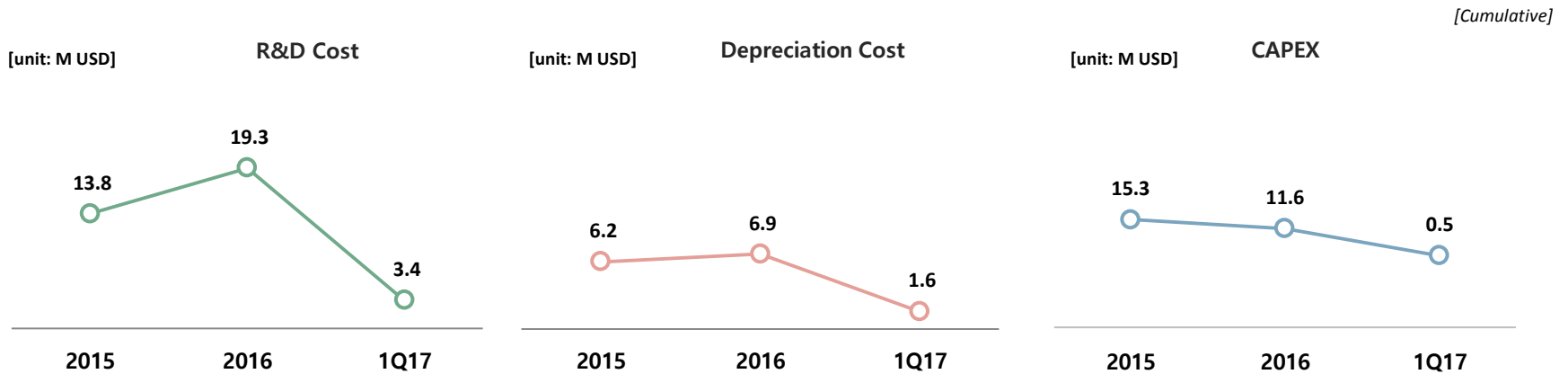
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Quarterly Total Revenue & Operating Margin (Consolidated)

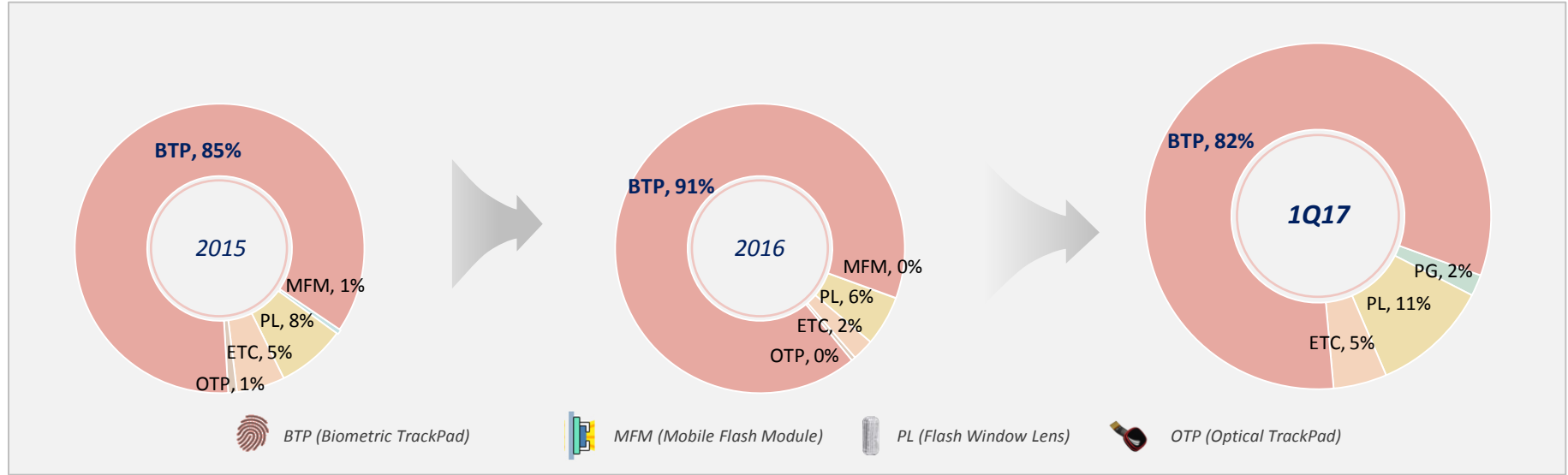


[unit: M USD]	2015	2016	1Q17
Revenue	262.5	320.0	43.3
OP	14.3	8.3	(7.8)

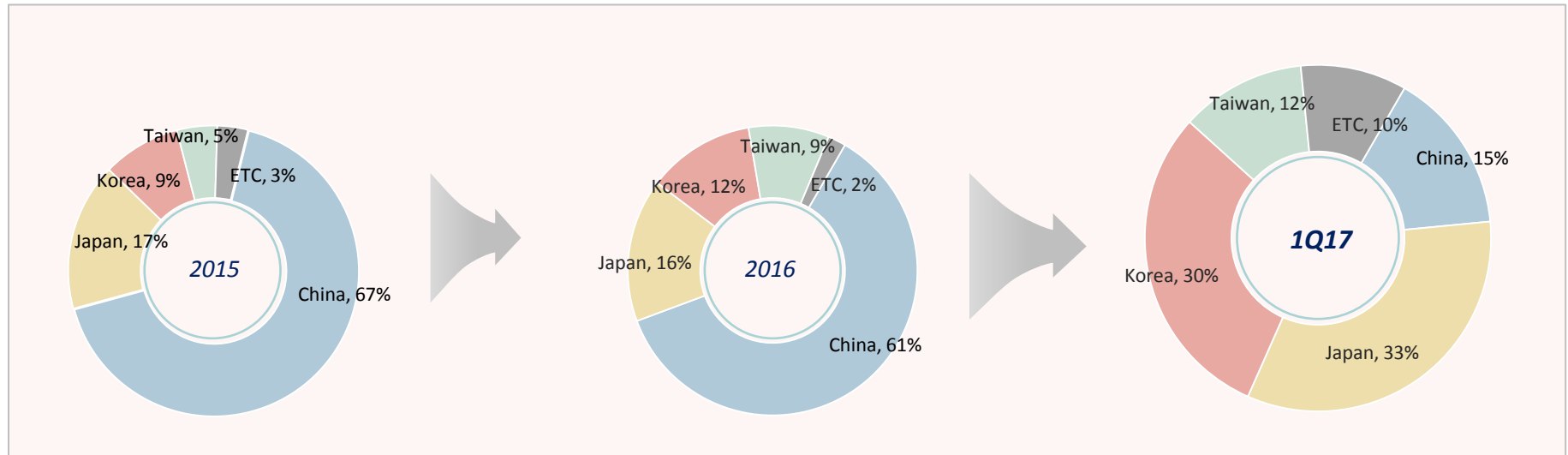
Investment Activities (Consolidated)



Products Revenue Breakdown



BTP Customers Revenue Breakdown

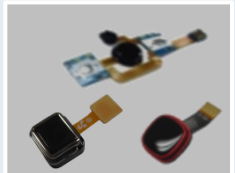
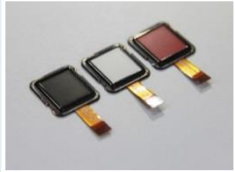


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CT Solution Applied Devices by Products

BTP/OTP



[LG]
G6



[LG]
Stylus3



[TCL, Blackberry]
KeyOne



[Sony]
Xperia XZ Premium



[Google]
Pixel



[LG]
V20



[Huawei]
Nova & Nova+



[Lenovo]
Moto Z Play



[Gionee]
M6 & M6+



[HTC]
A9s



[Lenovo]
Moto Z



[Motorola]
Moto G4 Plus



[Huawei]
P9



[LG]
G5



[VIVO]
X6 & X6 Plus



[Meizu]
Metal



[Microsoft]
Surface Pro 4



[Google]
Nexus 6P



[OnePlus]
OnePlus 2



[Huawei]
Honor 7



[FUJITSU]
Arrows A 301F



[BlackBerry]
Bold 9900

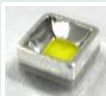


[BlackBerry]
Torch 9850



[Samsung]
Ch@t 335

MFM



[Samsung]
Galaxy Note2 / 3 / 4

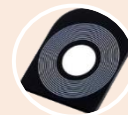


[Samsung]
Galaxy S3 / S4 / S5



[LG]
G2

PG



[Samsung]
Galaxy S7



[iriver]
Astell & Kern Junior



[iriver]
Astell & Kern 32

Balance Sheet

[unit: M USD / 1 USD=1,000 KRW]

	2015	2016	1Q17
Current Asset	171.0	173.1	164.9
Cash & Cashable Asset	10.0	5.8	1.7
Account Receivable	50.2	63.2	66.4
Inventory Asset	97.8	90.2	85.4
Fixed Asset	118.4	113.2	109.7
Tangible Asset	50.4	50.8	48.7
Intangible Asset	7.9	10.3	9.8
Total Asset	289.4	286.3	274.6
Current Liabilities	141.5	119.7	121.7
Account Payable	77.5	46.0	52.2
Short-term Debt	60.5	73.1	69.1
Fixed Liabilities	50.4	61.6	61.0
Corporate Bond & Long-term Debt	48.2	60.9	60.2
Total Liabilities	191.9	181.3	182.7
Capital	14.1	14.3	14.3
Total Equity	97.5	105.0	91.9

Income Statement

[unit: M USD / 1 USD=1,000 KRW]

	2015	2016	1Q17
Revenue	262.5	320.0	43.3
COGS	210.9	266.4	41.0
Gross Profit	51.6	53.6	2.3
Gross Profit (%)	20%	17%	5%
SG&A	37.3	45.3	10.0
Operating Income	14.3	8.3	(7.8)
OI (%)	5%	3%	(18%)
EBITDA	37.0	15.2	(6.2)
EBITDA (%)	14%	5%	(14%)
Non-operating Profit & Loss	(0.7)	(5.9)	(8.1)
Pre-tax Profit	13.6	2.4	(15.9)
Corporate Tax	2.9	2.1	(1.9)
Net Income	9.6	0.3	(14.0)



THANK YOU



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