



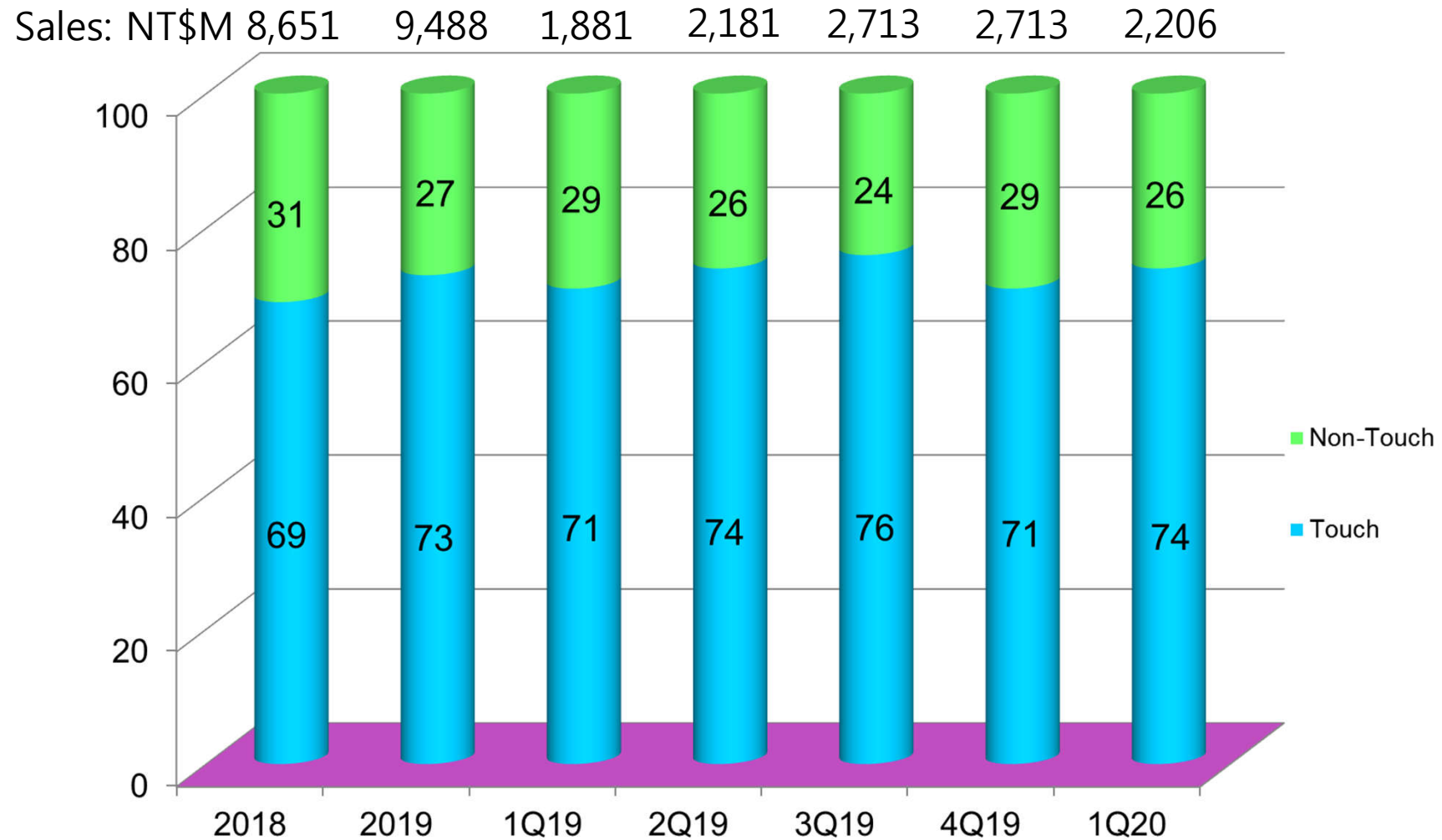
ELAN Smart-Input™ Solutions

Dual Transformation through AI



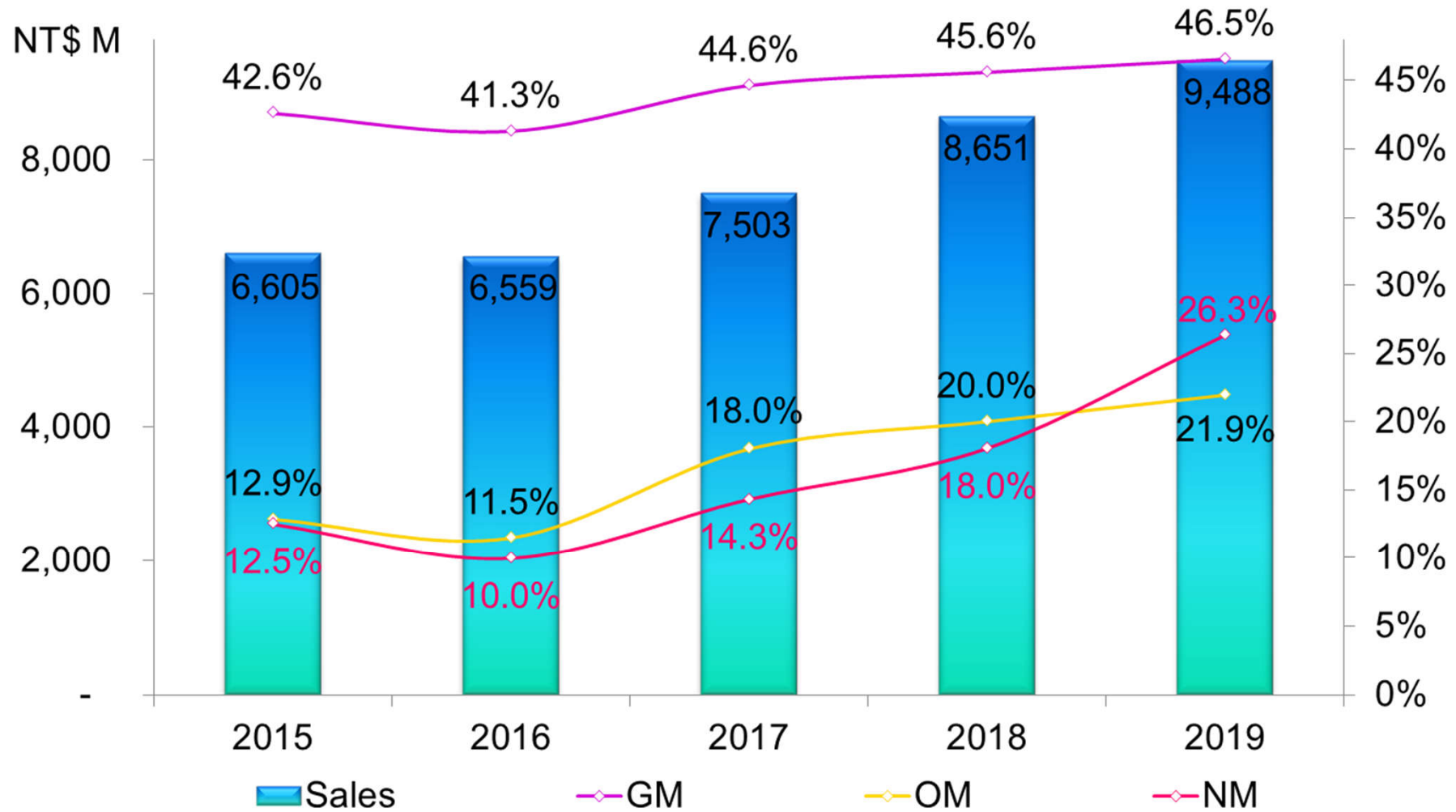
ELAN Microelectronics Corporation

Sales Breakdown by Product Line (Consolidated)



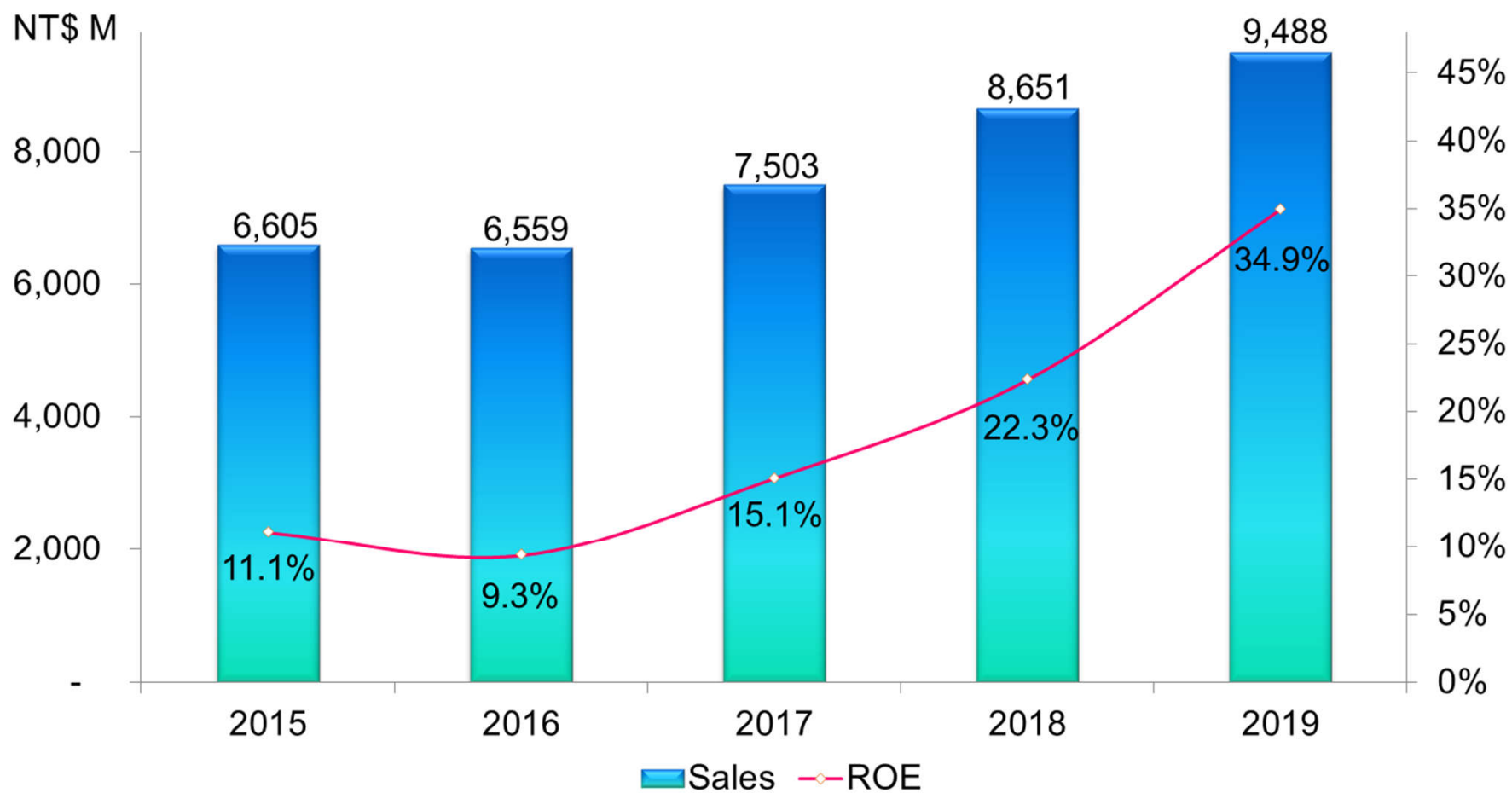
- Touch: Touchscreen Controller, Touchpad, Biometrics
- Non-Touch: MCU, Pointing Stick, Affiliated Co. Products

Sales & Profitability Trending Up





ROE Trend



Payout Ratio

Unit: NT\$

Year	EPS	Dividend			Payout Ratio (%)
		Total	Cash	Stock	
2019	8.57	6.50	6.50	0.00	75.8 (EPS Based on Net Profit) 91 (EPS - Operating Profit)
2018	5.35	5.00	5.00	0.00	93.5
2017	2.58	2.58	2.58	0.00	100
2016	1.57	1.57	1.57	0.00	100
2015	1.98	2.03	2.03	0.00	102.6
2014	3.61	3.66	3.66	0.00	101.3
2013	3.8	3.53	3.53	0.00	92.9
2012	3.02	3.00	3.00	0.00	99.5

- 2018 capital reduction NT\$3 in 4Q18 (new capital)
- 2019 based on the weighted average number of shares outstanding

New Catalyst in 2020 (WFH, Online Education, Stay at Home)

1. Touchpad

- ELAN market share will continue to grow in both consumer and commercial segments
- Chromebook sales are increasing at dramatic rate with Online Education (ELAN: ~90% Share)
- Blend ASP is higher than existing selling price.
 - ✓ Haptic-Pad / Lighting-Pad / Fingerprint on Touchpad / Total Solutions

2. Touchscreen

- Touch penetration rate is higher than last year, also higher Pen-Capable penetration (i.e. higher ASP)
- Blend ASP is higher than last year.
 - ✓ PCBA module / New spec. launch (MPP2.5) / New model launch

3. Fingerprint Sensor – (Acer/Asus/HP/Lenovo/Dell)

- Fingerprint sensor in NB market penetration rate rising
- New customers and new product segments for 2020 product launches
- New Windows Hello spec for 3D Anti-spoofing with ELAN leading the way

4. Point Stick

- New Tier 1 customer with product launch in 2020

5. Smartphone Market

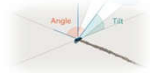
- Android Q Fingerprint Anti-spoofing spec for Capacitive and Optical Fingerprint Sensor
- OLED Touch controller with pen & TDDI with pen function.

ELAN Cash Cow

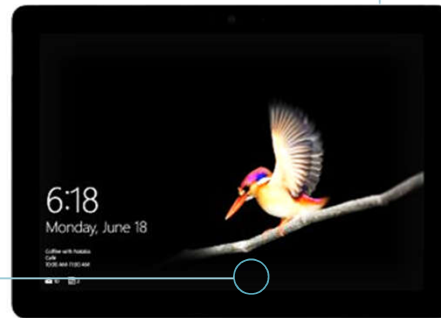
Touchscreen Controllers (World Wide #1)



MPP Standard & MPP Pro



Tilt Sensing



SMART HUMAN INTERFACE LEADER

Fingerprint-ID (World Wide Top 2)



MOH (Encryption)
MOC (Secure Bio)

Touchpad Modules (World Wide #1)



Touchpad



Lighting-Pad



ID-Pad



FIDO Dongle



FP Keycap

Point Stick (World Wide #1)



Point Stick Generations



FP Mouse



FIDO Mouse



ELAN Touchpad Highlights



NFC

Integrated with
Touchpad



Fingerprint

Integrated with
Touchpad



Haptic/Pen

Integrated with
Touchpad



LightingPad

Integrated with
Touchpad

#1

Touchpad
Market Share

>90%

Chromebook
Touchpad
Market Share

Smart-
Usability™

Best In-Class Palm
Prevention

462M

NB Touchpads
Shipped* from
2011~2019

81M

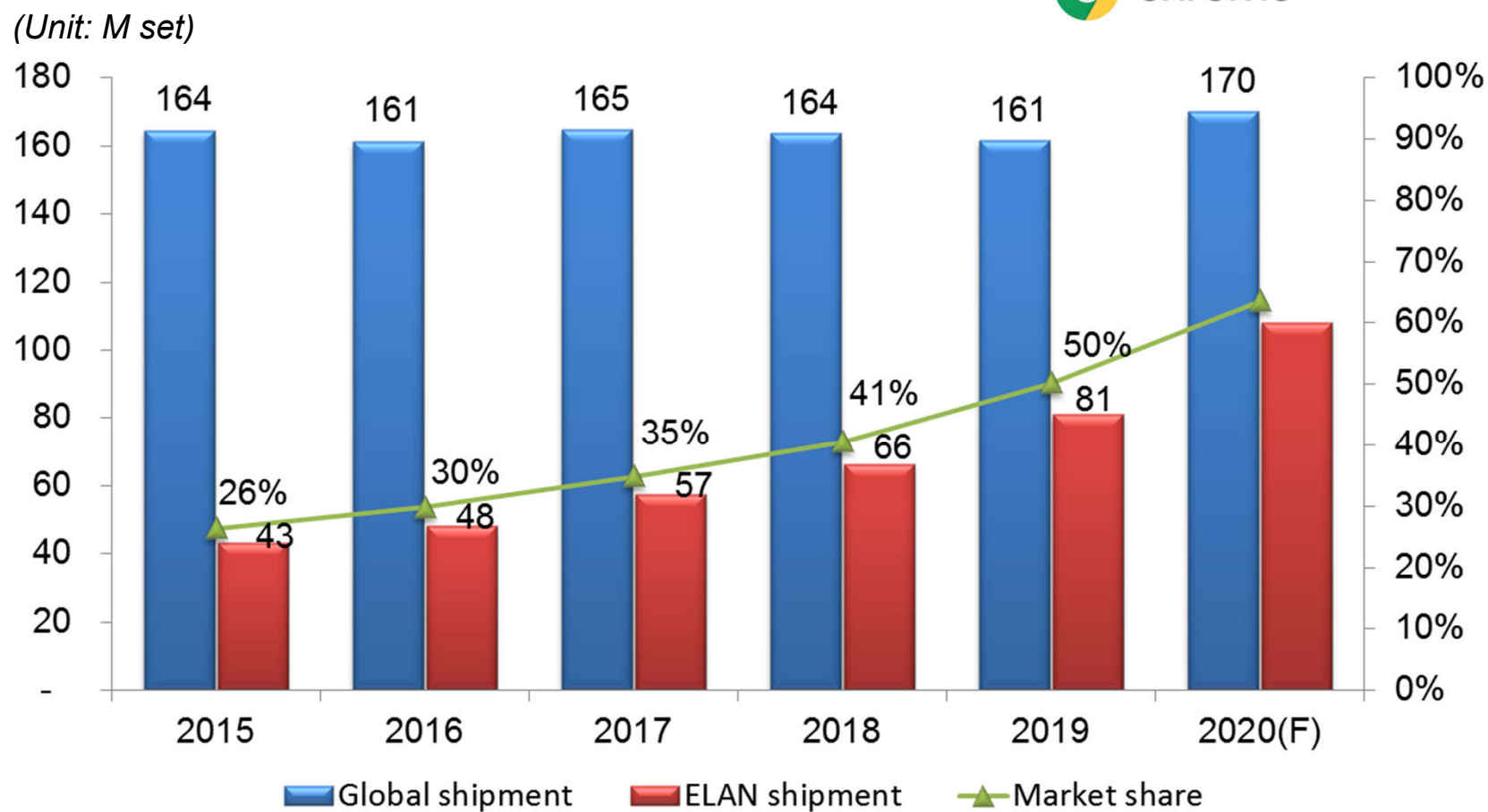
Shipped* in 2019

100+

Projects Kick-Off
Capability per
Year

*Unit

NB Touchpad Shipments Global vs. ELAN

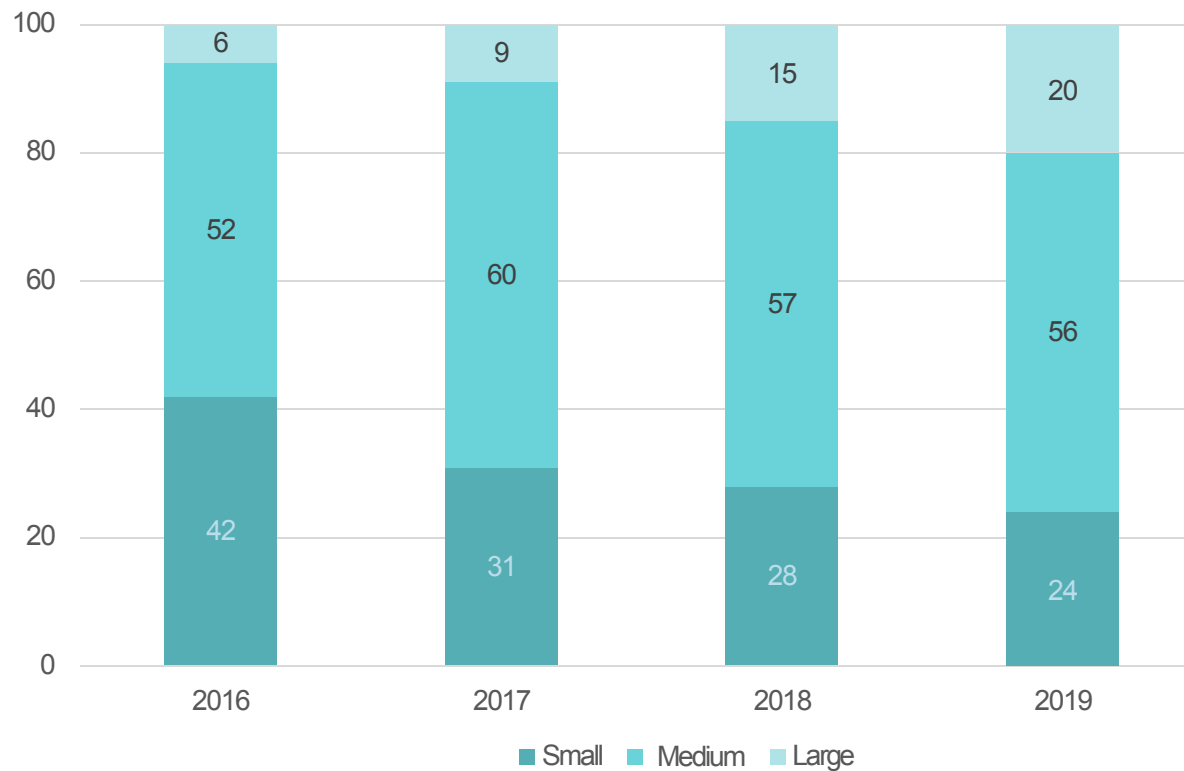


Source: TrendForce, TRI, SinoPac, ELAN



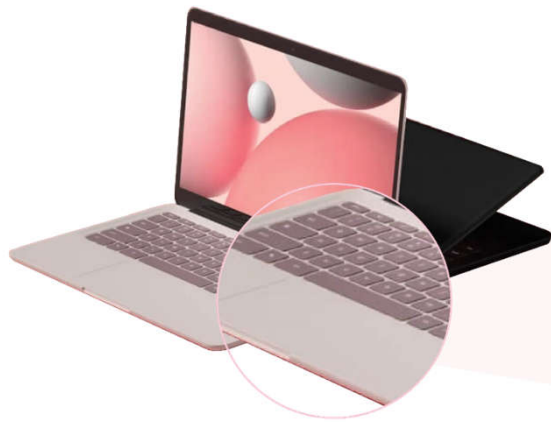


Touchpad Size Trends

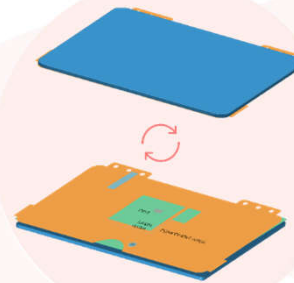


- Small: $<100 \times 60$
- Medium: $100 \times 60 <$ or $<120 \times 70$
- Large: $>120 \times 70$

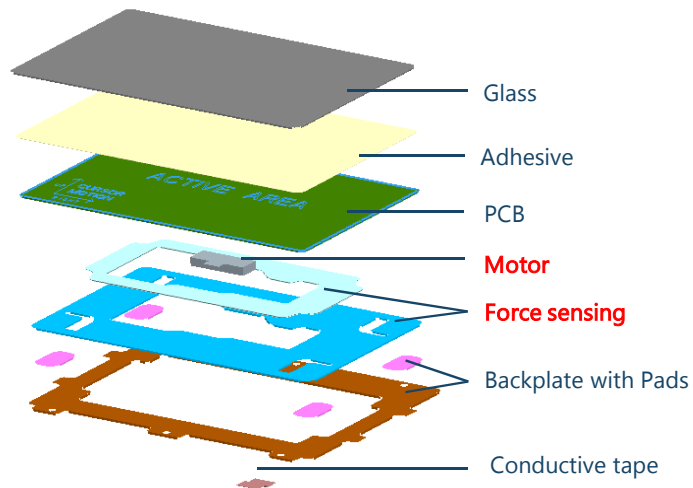
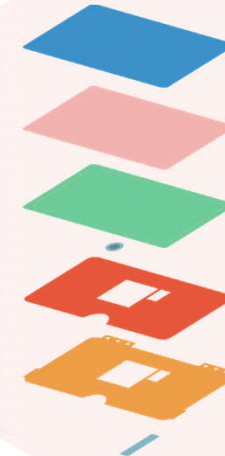
ELAN Touchpad Total Solution Inside



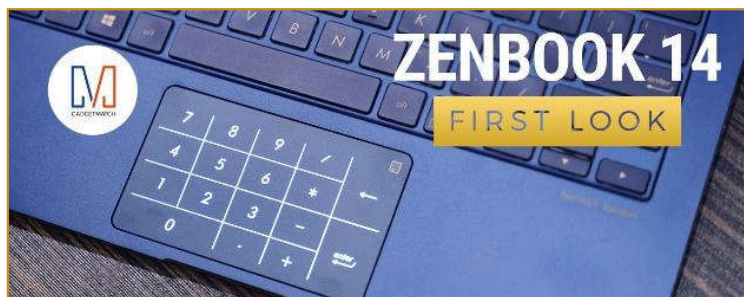
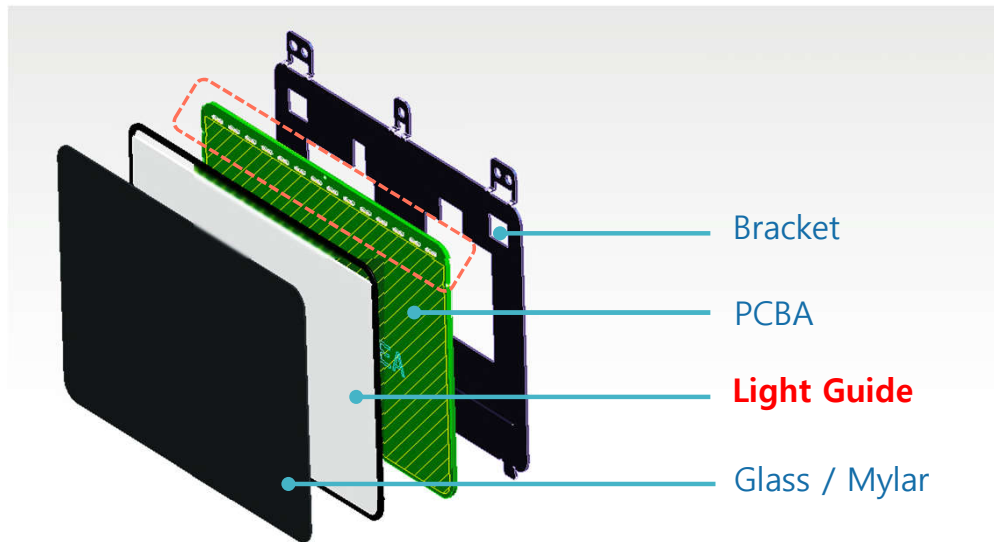
ELAN Haptic Pad Solution



Smart-HapticPad™ with Pen



ELAN-Lighting Pad



ELAN NB Touchscreen IC Highlights



Protocol

MPP1.51/2.0/2.5
AES1.0/WGP/USI1.0



Stack Up

Out-Cell/On-Cell
In-Cell



Display

LCD/R.OLED/
F.OLED/EPD

8

Consecutive Years
As Touch IC
#1 WW

#1

Touch IC Market
Share for
Out/On-Cell

>50%

Touch IC with Pen
Capable

100M

Notebook Ship*
through 2019

17M

Shipped* in 2019

10M

Support MPP Pen
Shipped* in 2019

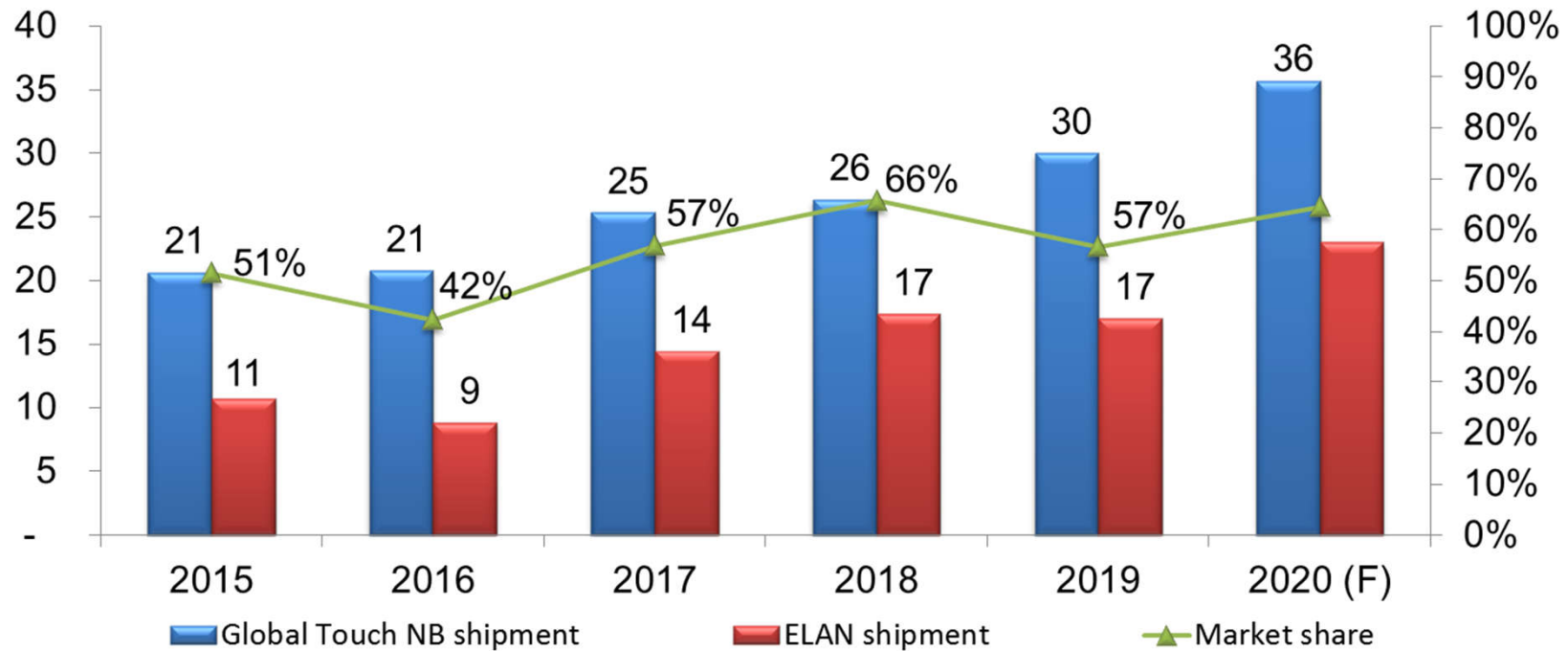


*Unit

NB Touchscreen Shipments

Global vs. ELAN

(Unit: M set)



	2015	2016	2017	2018	2019	2020(F)
Global NB Q'ty	147	148	149	146	146	155
Penetration Rate	14%	14%	17%	18%	21%	23%

* PS.: Global Touch NB Q'ty excluding Apple which does not support touchscreen function

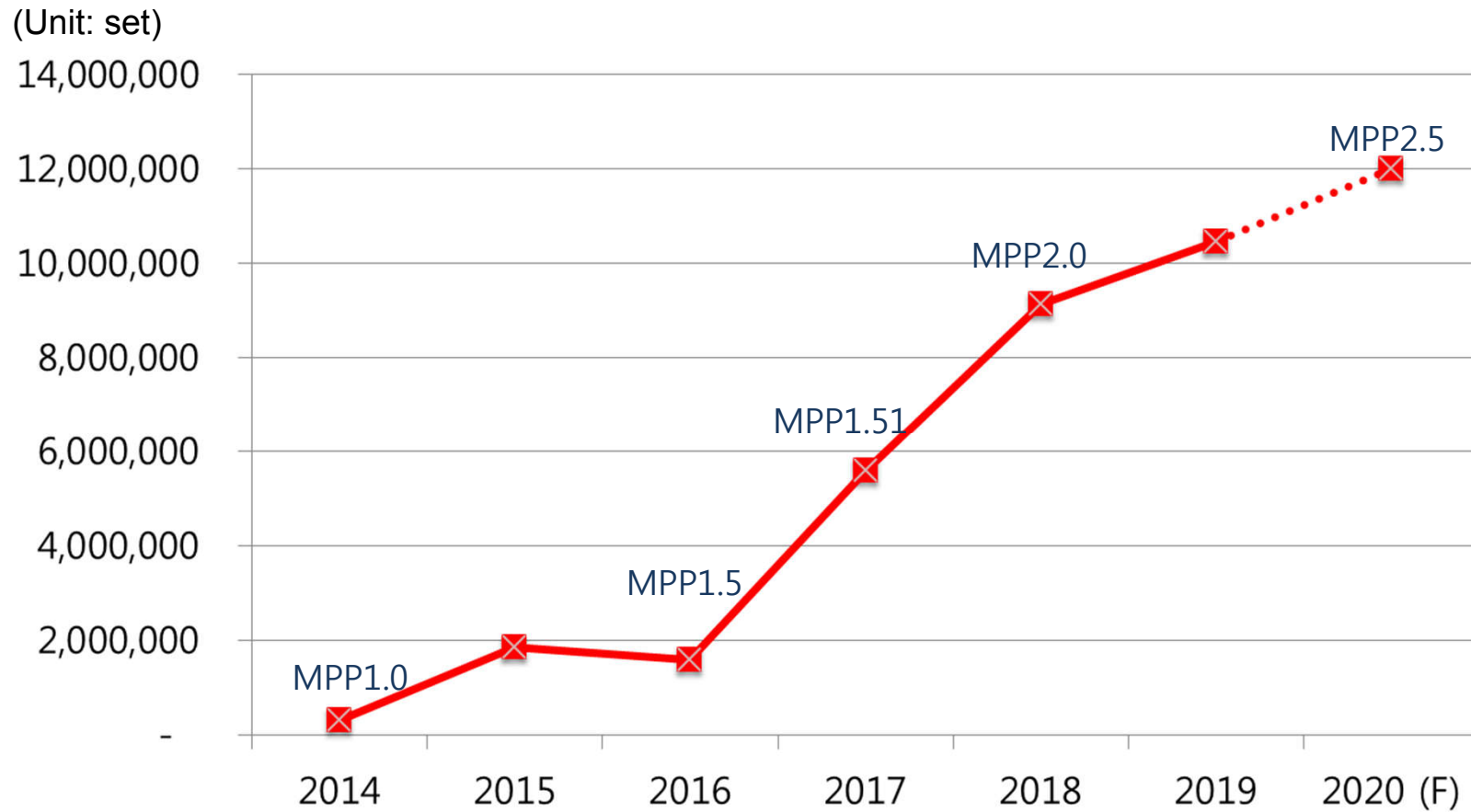


ELAN Ships Touchscreen & Touchpad Both Solutions

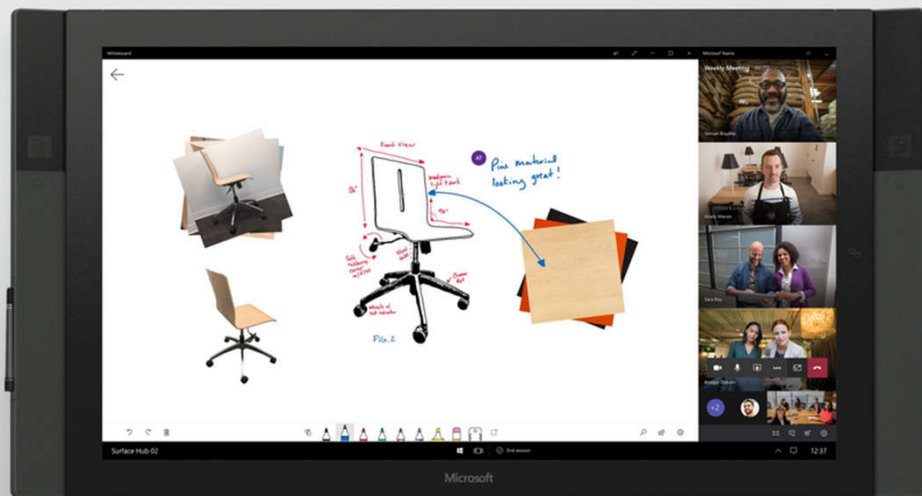
New Model – Surface Go 2nd Gen. & New Model



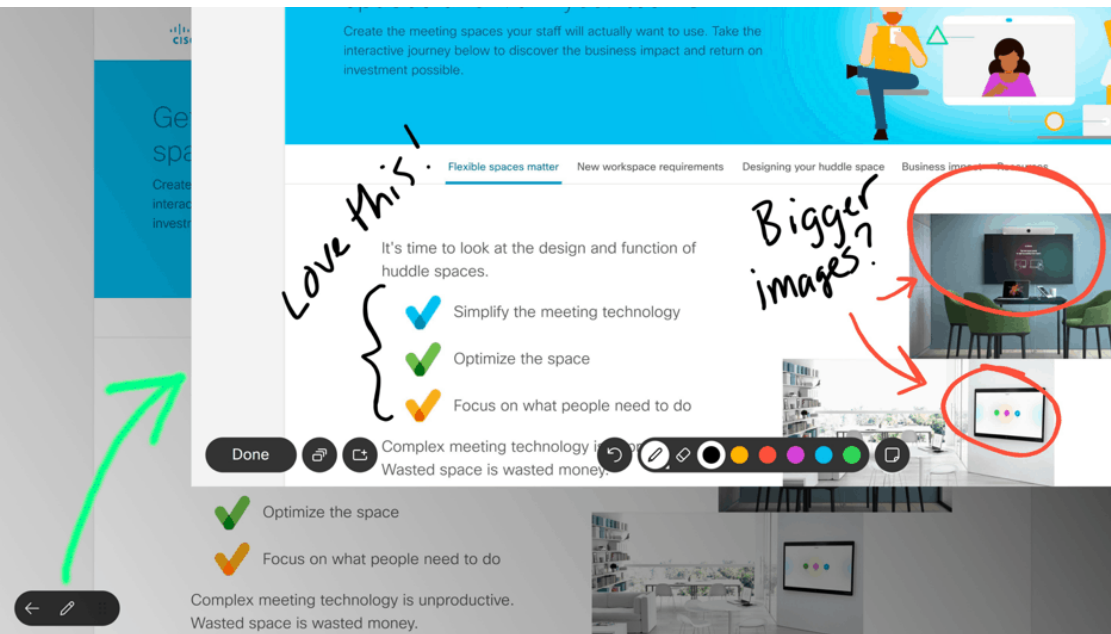
ELAN Touchscreen Controller with Pen Function Shipments



Video Conferencing with Whiteboard



Video Conferencing with Annotations



Microsoft Surface Series

All Devices Compatible with MS Pen

Tablet with KB Cover

Surface Go 10" (\$399+)



Tablet with KB Cover

Surface Pro 12.3" (\$799+)



Clamshell

Surface Laptop 13.5" (\$799+)



Detachable Clamshell

Surface Book 13.5"/15.6" (\$1,499+)



AIO Desktop

Surface Studio 28" (\$2,999+)



Seamless Across Multi-Platform with Active Pen
with ELAN Touch IC Inside

Infinix Note 6



Surface Go



Laptop



ELAN Touch Solution for OLED Displays on NB



Intel Foldable Horseshoe Bend 17.3"

ELAN OLED Touch ICs Inside

#1

Market Share in
Touchscreen IC for
NB OLED

1st

OLED Phone with
Active Cap Stylus for
Infinix Note 6 Pro

4+

Panel Makers

6-17

Support 6" – 17.3"
Screen Size

ELAN Smart-PointStick™ Highlights

20+

Years Experience and
Mass-Production
Record

#1

Smart-PointStick™
Market Share
Worldwide

10

Consecutive Years
as #1 Worldwide

100M

Smart-PointStick™
Ship* from
2007~2019

~12M

Smart-PointStick™
Shipped* in 2019

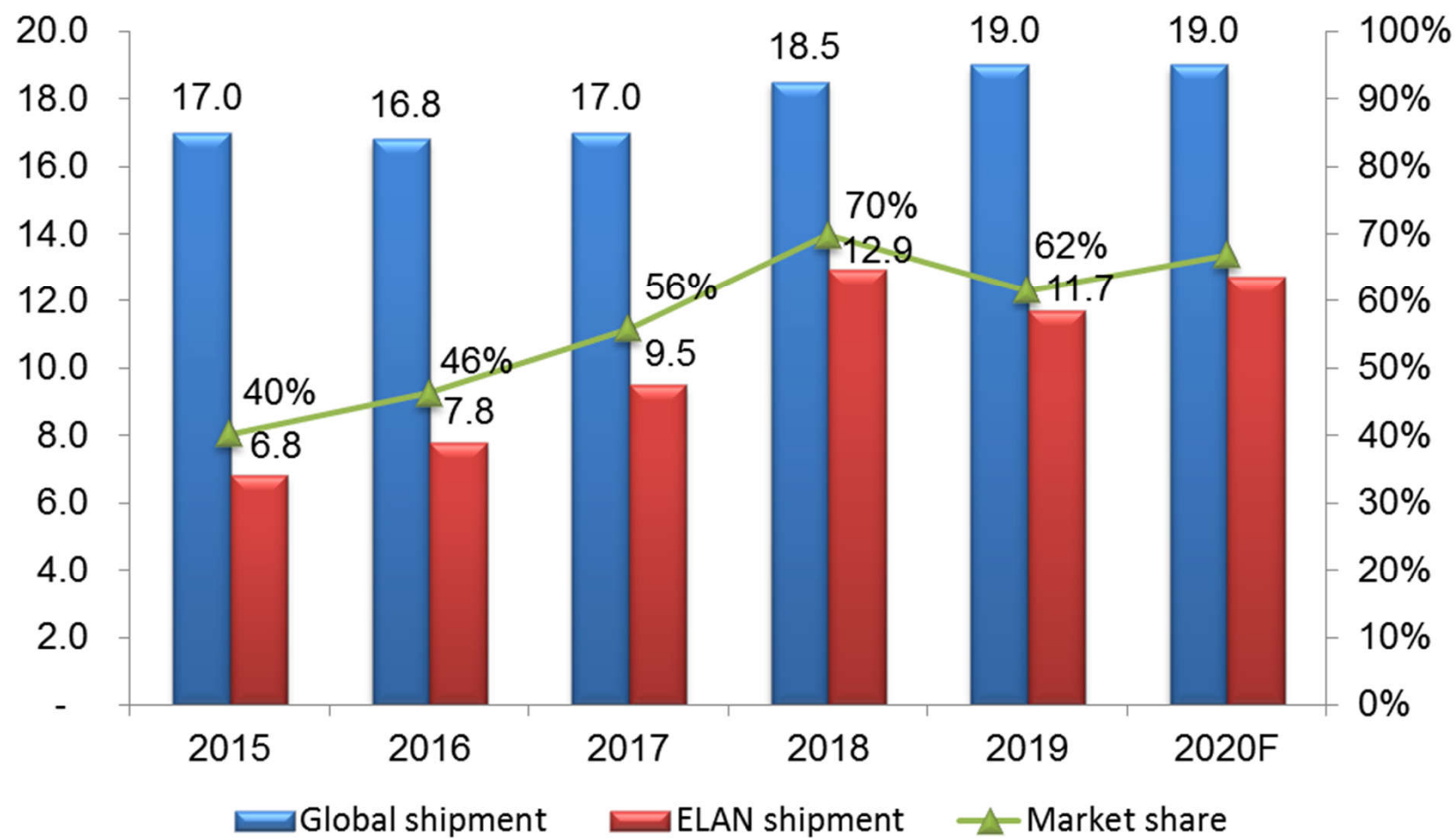
4mm

Ultra-thin Smart-
PointStick™ Solution

*Unit

NB PST Shipments Global vs. ELAN

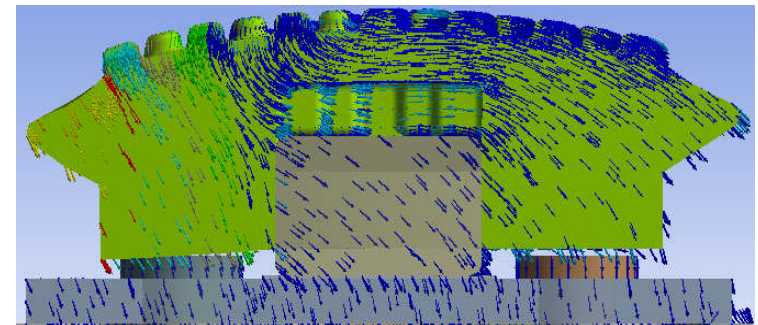
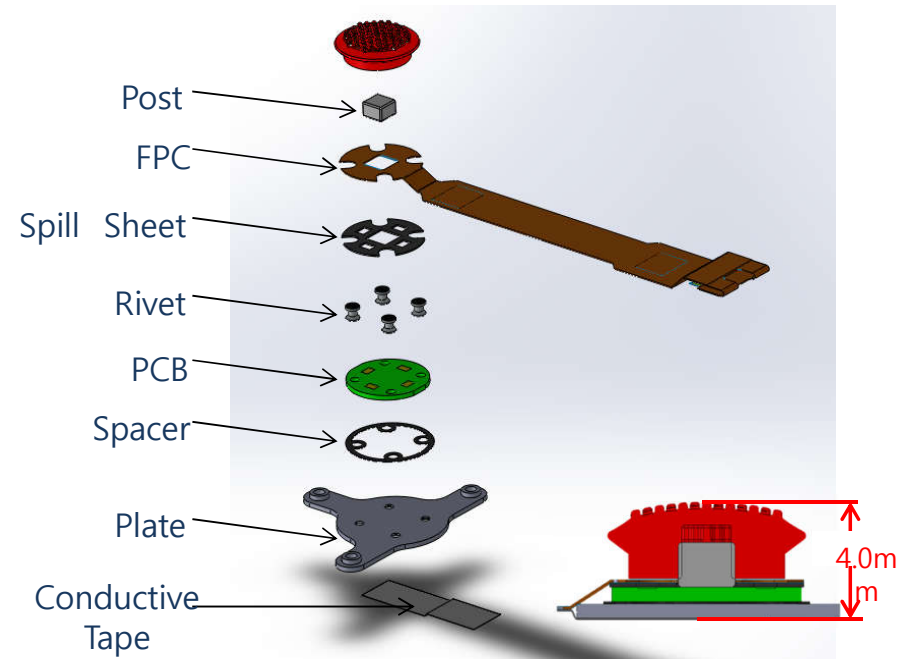
(Unit: M set)



Source: ELAN



ELAN Smart-Pointstick™



ELAN NB Fingerprint Highlights



Support 3D Anti-Spoof Feature for MOH/MOC
Meet MSFT Windows Hello 20H1 Spec



Offer Industry's Smallest Sensors for MOC



Single Chip Encryption for both MOH (Windows Hello) and
MOC (Secure Bio -> Enhanced Sign-in Security) Solutions 😊



Support Customized PBA/SSO for Commercial MOC



Support Multi-OS (Windows/Chrome/Linux/Android)

10⁺

Major Brands
Designed-In

5M

Notebook
Shipped* in
2019

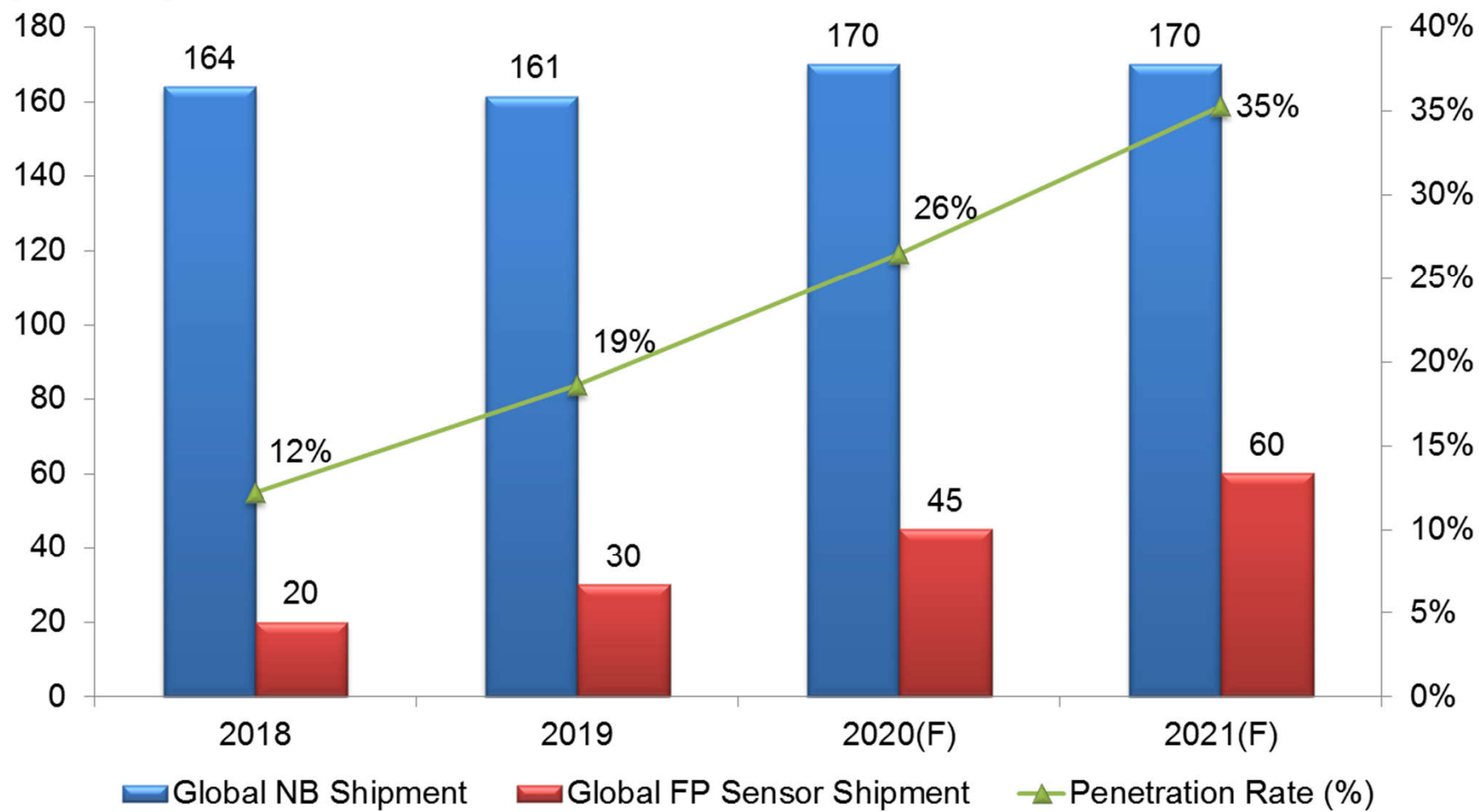
100%

ELAN
In-House
Algorithm

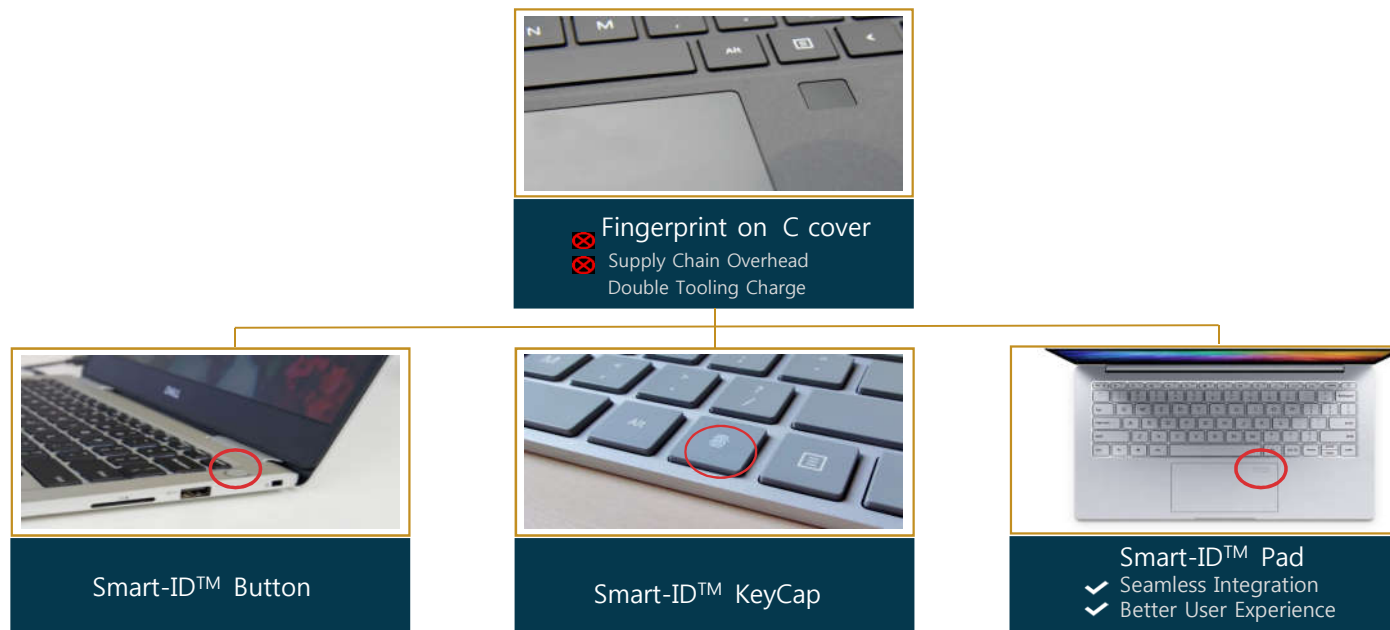
*Unit

Fingerprint Sensor in NB Market Trend

(Unit: M set)



Fingerprint Sensor in NB Trends Going Up



2020 & 2021 Opportunity

- Gain Market Share (MOC ASP & Penetration Rate)
- Fingerprint Solution on NB with 3D Anti-Spoofing



Spoof & Live Finger Image Comparison



fake finger
(conductive silicon)



fake finger
(gelatin)

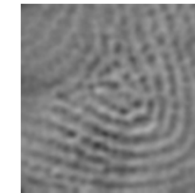
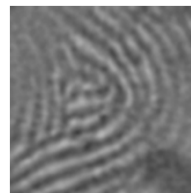
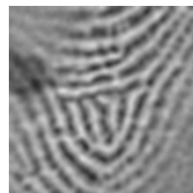


live finger

Capacitive
Sensor



Optical
Sensor



ELAN's Support for the Latest Windows Hello Spec 20H1

Tightening of FRR Requirement while requesting for Enhanced Anti-Spoofing Feature

- FAR < 0.001% @ Large Area Sensors (160x160 pixels);
FAR < 0.002% @ Small Area Sensors (<160x160 pixels)
- Effective, real world FRR with Anti-Spoofing or liveness detection 10% ➡ 5%
- Presentation Attack Detection Measures are required

Recommendation	SAR	Attacks Covered	Justification
Cooperative Presentation attacks that capture 3D information of a fingerprint	<10%	Cooperative Play-Doh(gelatin) presentation attacks , Dental grade silicone presentation attacks	Cooperative Presentation attacks are like sharing your password with someone; equivalent to sharing the user gesture
3D Printed presentation attacks	<10%	3D reconstruction of a fingerprint via a series of images being 3D printed as a presentation attack	This method may arise as a more consistent means of spoofing as time and technology progresses

SAR : Spoof-Accept-Rate

Spoof-Accept-Rate(SAR) Test Comparison Table

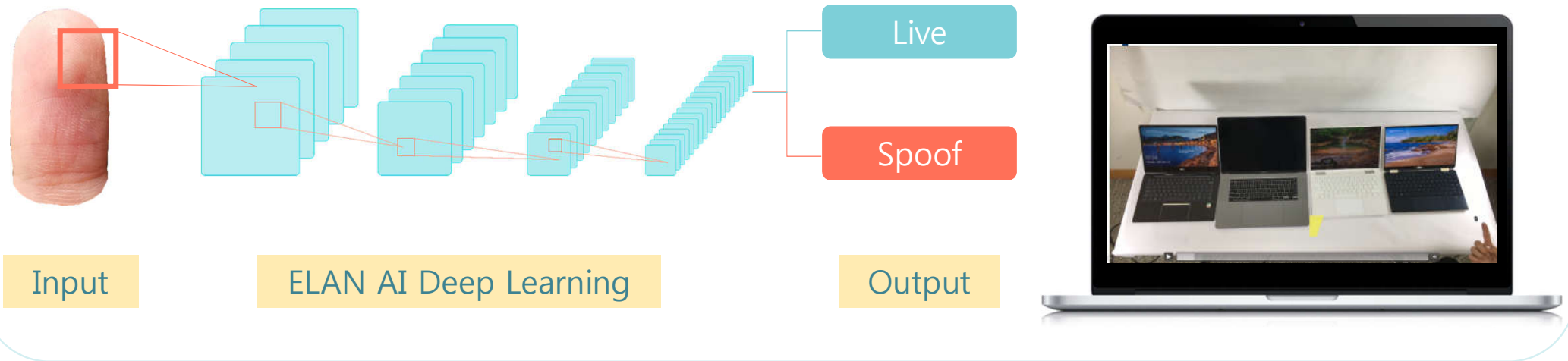
ELAN's SAR leads the Industry

Sensor Vendor	Picture	MSFT Spec	ELAN	Competitor 1	Competitor 2
FRR(%) with Anti-Spoofing		10% → <5%	Meet	Meet	Meet
3D SAR(%) Gelatin		<10%	0.03%	56.11%	1.67%
3D SAR(%) Silicon		<10%	1.67%	77.78%	25.56%

- Effective, real world FRR with Anti-Spoofing or liveness detection 10% → 5%

ELAN's AI-Based Deep Learning for Anti-Spoofing Feature

ELAN vs. Competitors

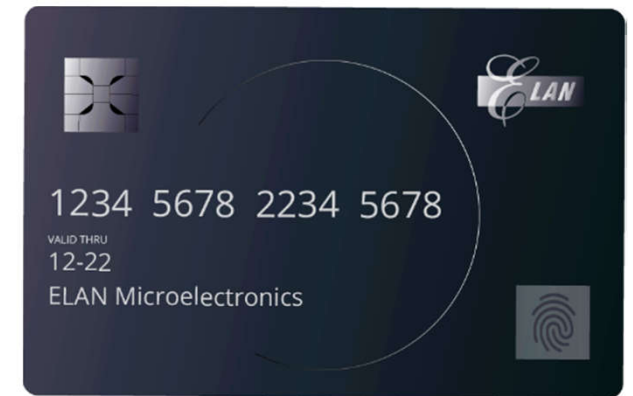


World's First Smart Card

MP With ELAN Fingerprint Recognition Sensor



ELAN Smart-ID™ Ultra-low Power Fingerprint Sensor for Battery-less Card



ELAN Human Input Portfolio

For Smartphone

TDDI

Face ID Sensor

Touch Controller

Fingerprint Sensor

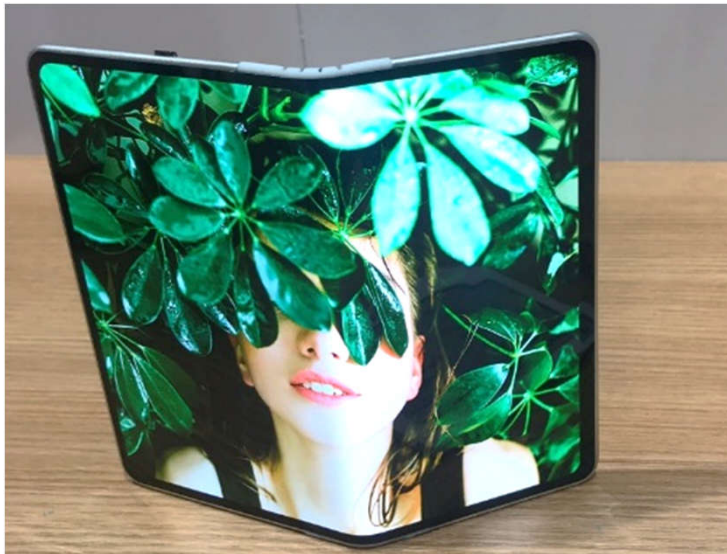
TDDI with Pen Function

Touch Controller with Pen Function



Flexible Phone with Pen Will be a Trend

Flexible OLED @ SID Show
with ELAN Touch IC Inside



7.77" QXGA Foldable AMOLED



Major Biometrics Requirement in Android Q

	SAR	FRR	FAR
Requirement	$\leq 7\%$	$< 10\%$	$< 0.002\%$

Change Summary

Here's the summary of the changes being planned for the Q CDD

- Adding a new tier of biometrics - Biometrics can be in one of 3 tiers based on SAR:
 - Strong (SAR $\leq 7\%$)
 - Weak ($7\% < \text{SAR} \leq 20\%$)
 - Insecure/Convenience (SAR $> 20\%$)
 - Strong Biometrics have the same requirements as in P
 - Weak Biometrics
 - Are subject to a 8-hour timeout before needing to fall back to pin/pattern/password
 - Cannot be exposed to applications at all. This implies it isn't usable for payments, etc.
 - Need to ensure that their biometric pipeline is secure
- [C-SR] Are STRONGLY RECOMMENDED to have a false rejection rate of less than 10%, as measured on the device.
 - [C-SR] Are STRONGLY RECOMMENDED to have a latency below 1 second, measured from when the biometric is detected, until the screen is unlocked, for each enrolled biometric.

Planned Changes

- *Planned changes are highlighted in blue but are subject to change*

([Current section 7.3.10 for easier comparison](#))

7.3.10. Biometric Sensors

If device implementations include a secure lock screen, they:

- SHOULD include a biometric sensor.

If device implementations include one or more biometric sensors, they:

- [C-1-1] MUST have a false acceptance rate not higher than 0.002%.
- [C-1-2] MUST disclose that this mode may be less secure than a strong PIN, pattern, or password and clearly enumerate the risks of enabling it

Conclusion

1. Touchpad

- ELAN market share will continue to grow in both consumer and commercial segments
- Chromebook sales are increasing at dramatic rate with Online Education (ELAN: ~90% Share)
- Blend ASP is higher than existing selling price.
 - ✓ Haptic-Pad / Lighting-Pad / Fingerprint on Touchpad / Total Solutions

2. Touchscreen

- Touch penetration rate is higher than last year, also higher Pen-Capable penetration (i.e. higher ASP)
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3. Fingerprint Sensor – (Acer/Asus/HP/Lenovo/Dell)

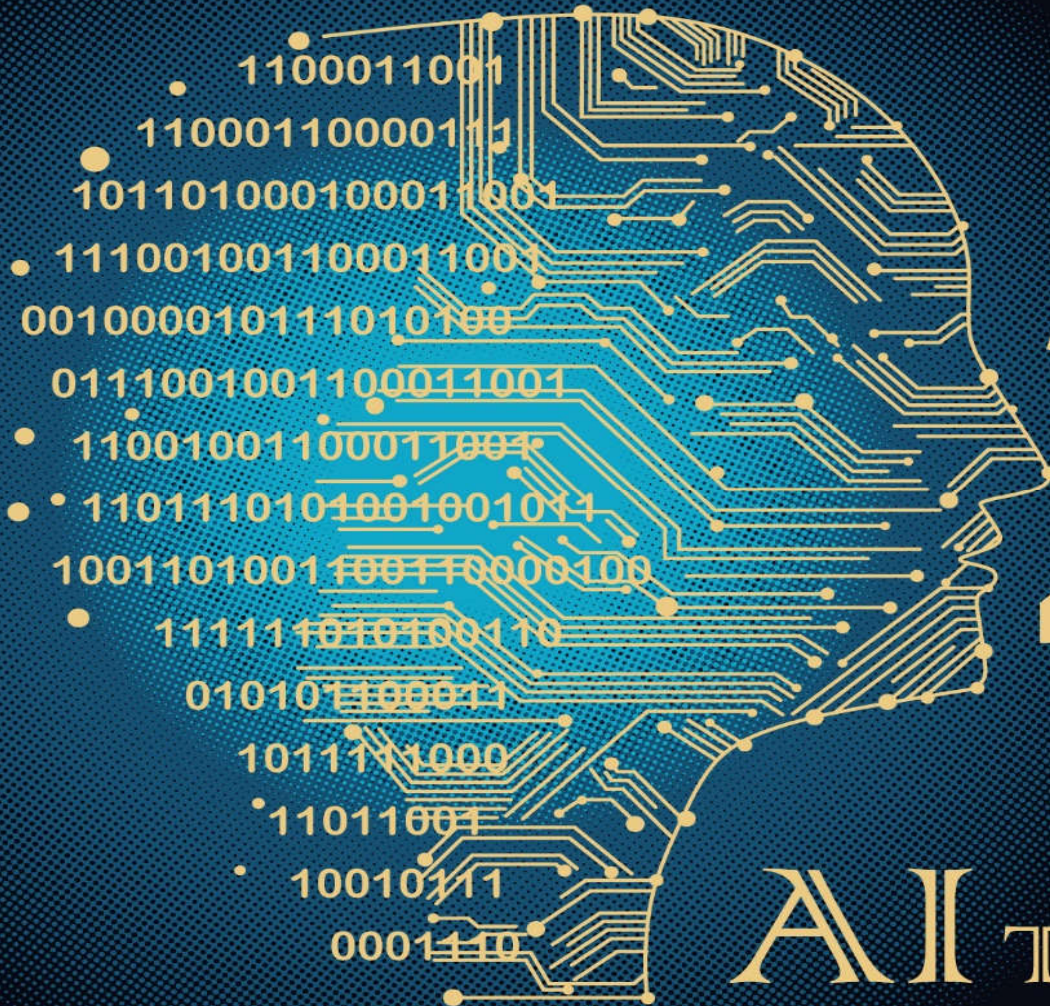
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4. Point Stick

- New Tier 1 customer with product launch in 2020

5. Smartphone Market

- Android Q Fingerprint Anti-spoofing spec for Capacitive and Optical Fingerprint Sensor
- OLED Touch controller with pen & TDDI with pen function.



Anniversary
25TH

AI Transformation

