TECHNOLOGY UPDATE

STOCKHOLM, NOVEMBER 1 2017

FINGERPRINTS

Disclaimer

FORWARD-LOOKING STATEMENTS

The presentation contains forward-looking statements with words such as “believes”, “anticipates”, “outlook”, “confident”, meeting” and “expects” about expected revenues and earnings, anticipated demand for fingerprint sensors, iris software and internal estimates. These forward-looking statements involve a number of unknown risks, uncertainties and other factors that could cause actual results to differ materially. Unknown risks, uncertainties and other factors are discussed in the “risk report” section of Fingerprint Cards´ Annual Report 2016 and in the Interim Reports.

Agenda

- 14:00 The way forward
  - Christian Fredrikson, CEO
- 14:40 Iris/Touchless
  - Vivek Khandelwal, Vice President of Product & Business Functions
- 15:00 Q&A (Vivek)
- 15:10 In-Display
  - Farzan Ghavanini, Senior Manager, Transducer Technology Development
- 15:40 Q&A (Christian and Farzan)

CHRISTIAN FREDRIKSON

CEO

The way forward

SEMICONDUCTOR

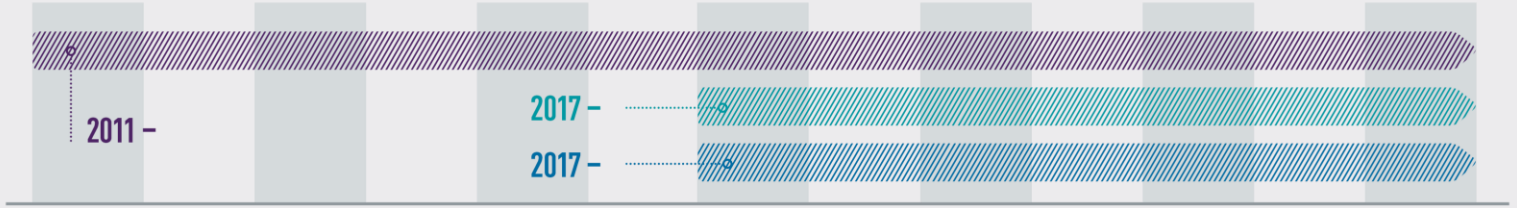
- Capacitive sensors in mobile

BIOMETRIC MULTI MODALITIES

- Smartcards for payments
- Touchless/Iris
- IoT
- In-Display

BIOMETRIC ID AND CYBER SECURITY

- Multi modalities
- “Smart Cities“
- Cloud solutions
- Application & server offerings



FINGERPRINTS

Focus areas

- Capacitive sensors
- Payments/Smartcards
- Touchless/Iris
- IoT/Cloud
- In-Display

- Reallocation of R&D*
- In 2018, around 10% (e) revenues from outside capacitive mobile*

* As previously communicated

Our patent strategy

- Intellectual property
  - Within a broad range of technologies
- Patent applications
  - On a global level
- Well balanced and fast growing patent portfolio
  - All aspects of the systems such as biometric algorithms, biometric image handling, sensing systems and packaging technology
  - 198 granted patents at date
  - More than 120 are directly related to biometric solutions
  - We expect to receive more than 25 new granted patents before end of 2017
  - Accelerating rate

CAPACITIVE SENSORS

Smartphones

Capacitive sensors in mobile

- Market
  - 2017 – below 750 million units
  - 2018 – Fingerprint sensors volume market growth at about 20% y/y (e)
  - A commodity market
  - Consolidation phase
- Market drivers
  - Reliability, flexibility and speed
  - Cost efficiency and security
  - Innovation
- Fingerprints' strengths
  - Market leader
  - Efficient and high production capacity
  - System capabilities
  - Technology competence
  - Customer relationships
  - Patents

PAYMENTS/SMARTCARDS

Payments/Smartcards

IN 3 YEARS

consumers think they will use more contactless payment cards and mobile payments

Today
In 3 years

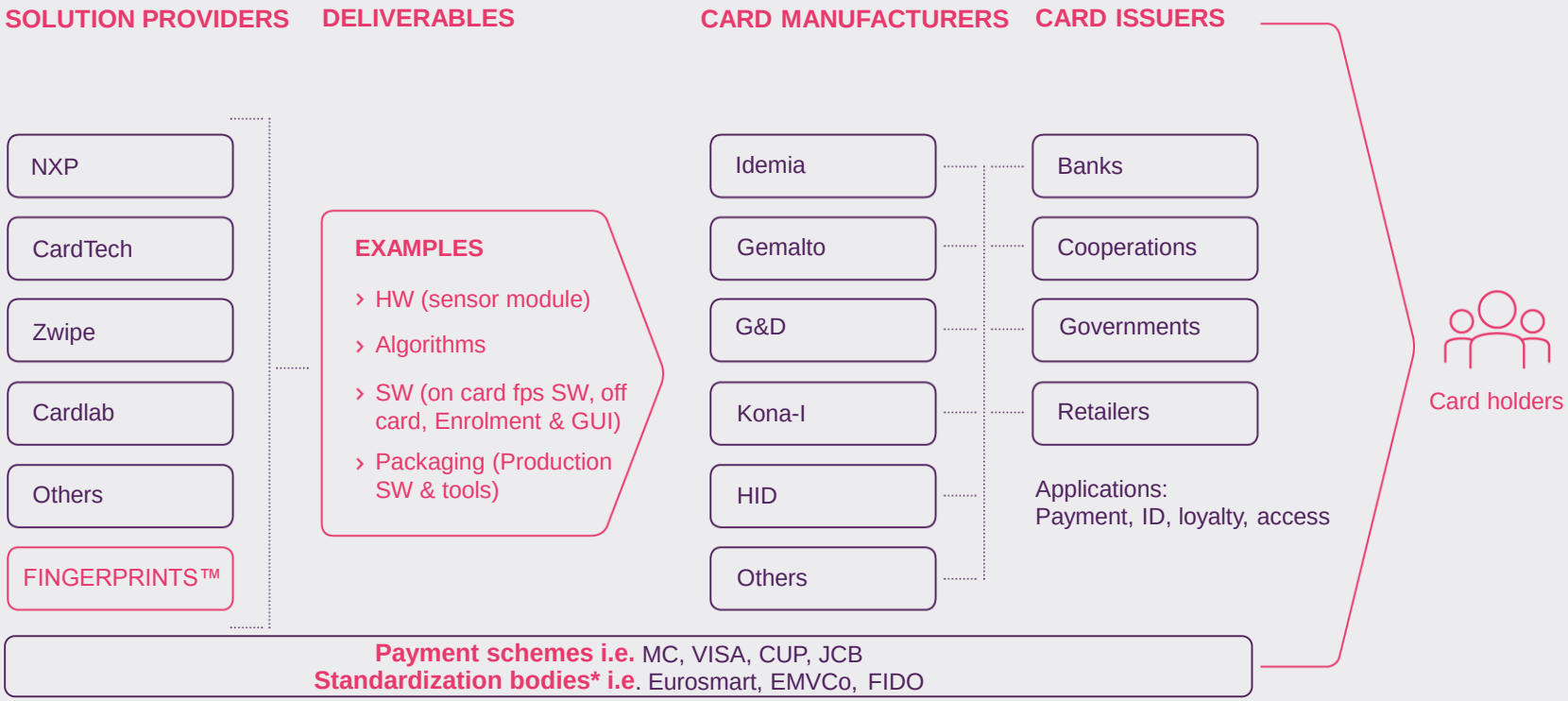
 SOURCE Fingerprints™ in collaboration with Kantar TNS. Base: 4,000 online consumers in China, India, UK, USA.

Payments/Smartcards

- Market
  - 2017: Approximately 4 billion smartcards produced/year
  - 2018: Commercial deliveries happening, larger volumes in 2019/2020
  - A market with high expected growth
- Market drivers
  - Convenience and security
  - Contactless payments without cap
  - Reduced fraud
  - New innovation and revenue opportunities

- Fingerprints' strengths
  - Strong experience in volume production, robust HW & stable SW
  - Offering biometric performance in a low computing power environment
  - Low power consumption, essential in smartcards
  - Strong collaboration with smartcard industry leaders

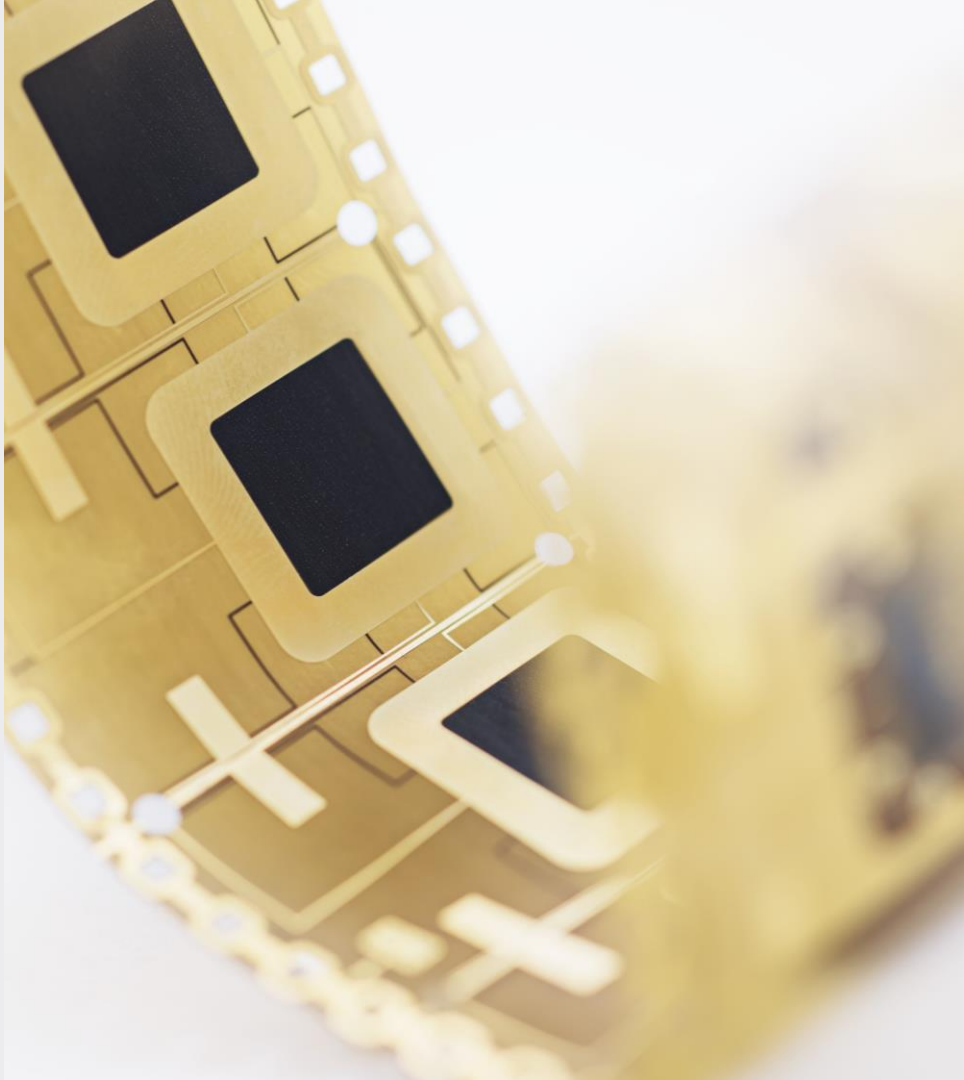
Mobilizing the smart card value



 * Set standards, are custodians of payment system integrity and act as catalysts for industry development initiatives like financial inclusion

T-Shape™

- For high volume production in Smartcards
- Easy to integrate
- Lower total card cost
- Ultra low power consumption
- Superior image quality and biometric performance
- Part of FPC1300-series




FINGERPRINTS
1987
ELIN ANDERSSON

IOT AND CLOUD

IoT and Cloud

- Market
  - 2018: For example, door locks and bank applications market at 5 to 10 million units (e)
  - Fragmented
  - Biometrics as-a-Service
  - New business model
  - Start-up phase
- Market drivers
  - Security (cyber security)
  - Cost efficiency
  - Public cloud deployments – Smart Cities
  - IoT drives Cloud solutions
- Fingerprints' strengths
  - Leadership position within biometry
  - System competence
  - Cloud competence
  - Understanding of biometric identity
  - ActiveIRIS®

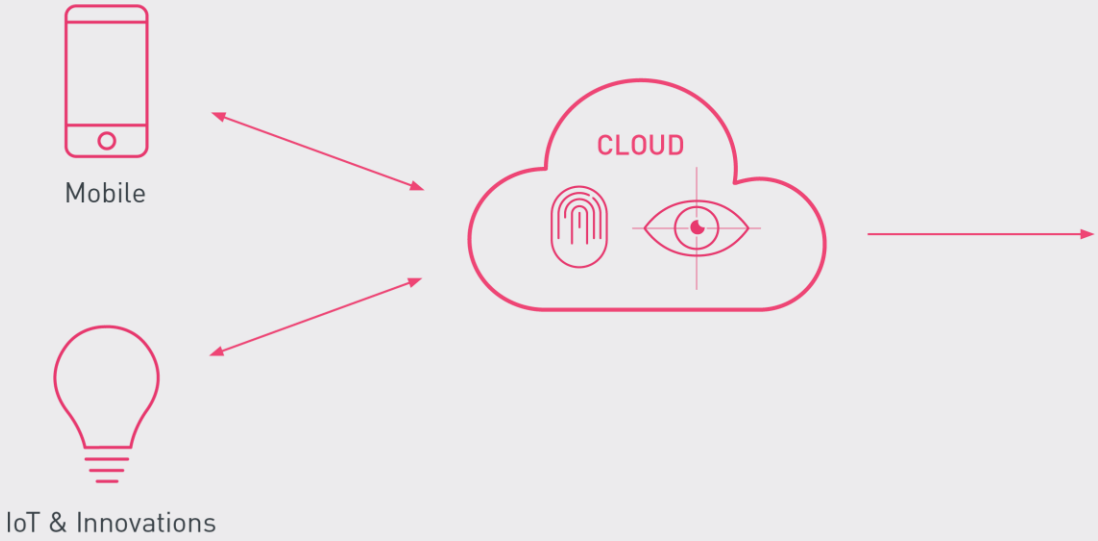

IoT - applications

IoT - applications

IoT - applications


IoT - applications

IoT - applications



BIOMETRICS-AS-A-SERVICE

CUSTOMERS

Companies

- Banks
- Apartments
- Hotels
- Casinos
- Automotives
- Public gatherings

Application

- Making their own applications – verified and secured by Fingerprints

Governments

- Border Control
- Smart Cities

Automotive – market trends

- Car sharing pools
- Electric vehicles
- Autonomous vehicles
- Mobility-as-a-Service
- Personalization and sensor data
- Use cases for biometry in cars and trucks

CES Shanghai 2017

CES Las Vegas 2017

TOUCHLESS/IRIS

Touchless/Iris

- Market
  - 2018: Over 80 million units (including Samsung)
- Market drivers
  - Touchless in mobiles and in automotive
  - Secure access applications
  - High security requirements
  - Demographic coverage

- Fingerprints' strengths
  - Expanding number of customers and regions through iris
  - Leading supplier of iris recognition technology
  - Existing customer base (India, Japan, US)
  - Multimodal solution: Strong combination of fingerprint sensor and iris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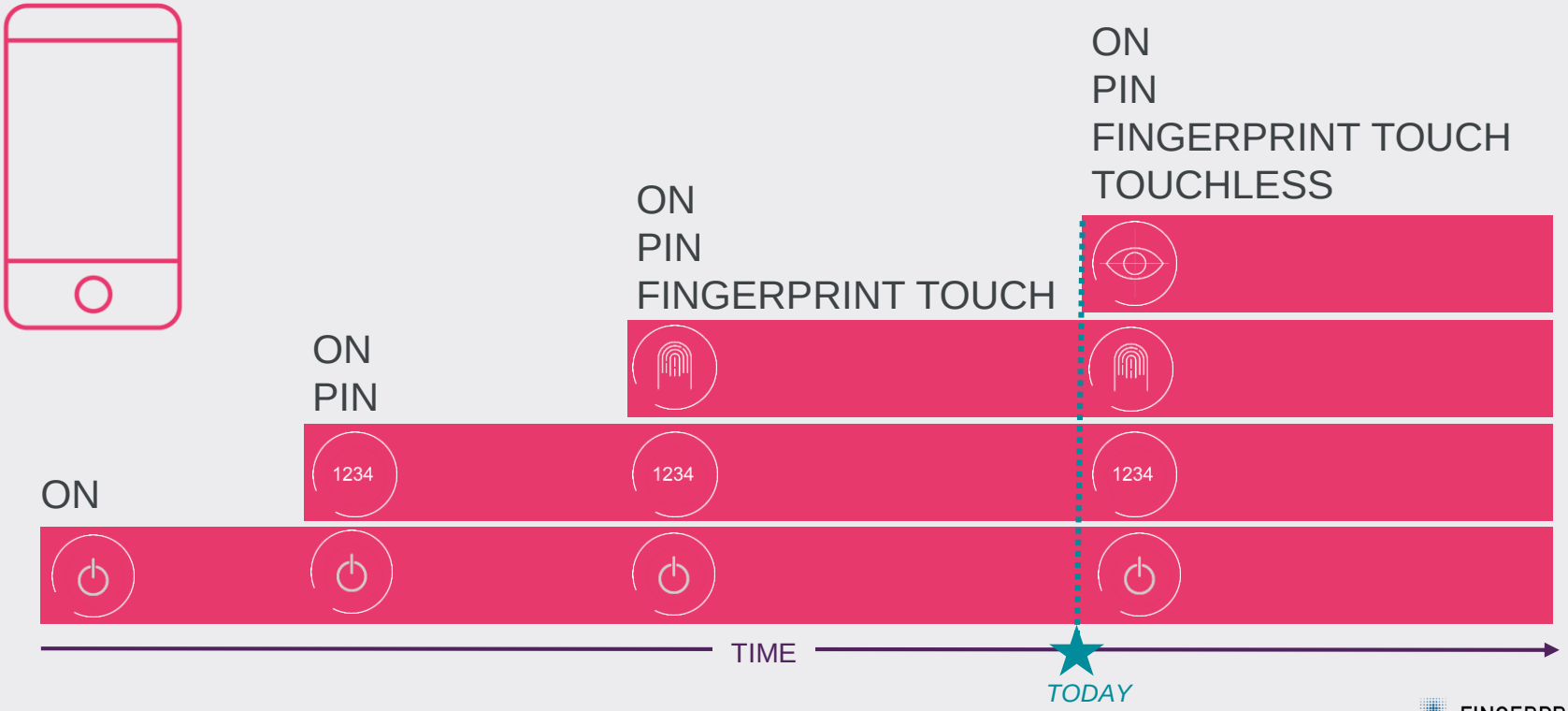
VIVEK KHANDELWAL

Vice President of Product & Business Functions

Market is evolving



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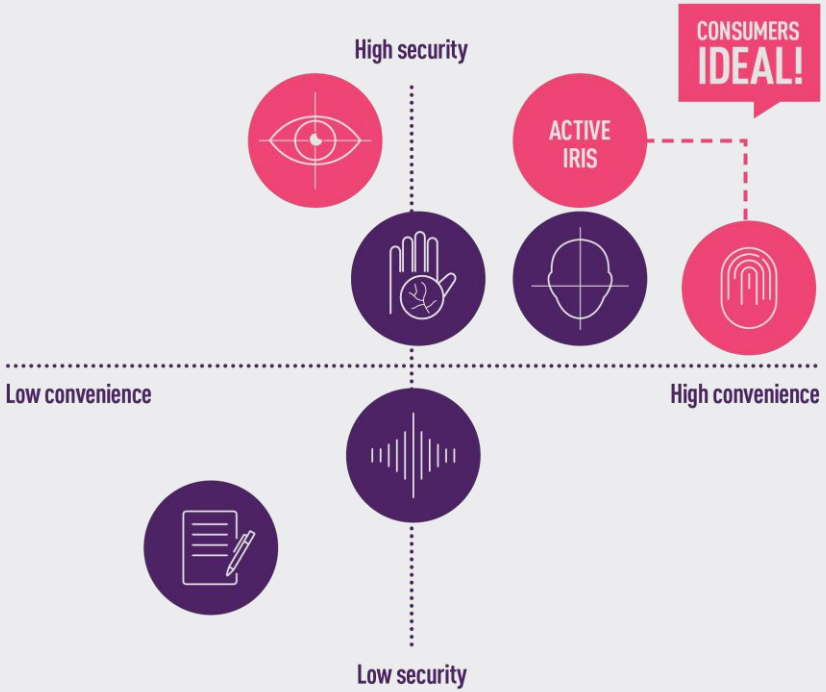
Multi-modal biometrics

- Consumers want convenience
  - Speed
  - Ease-of-use
  - High security

CONSUMERS PERCEPTION



Fingerprints™ Market Research April 2017 in collaboration with Kantar TNS
n = 4000 online consumers in China, India, USA, UK

Multi-modal biometrics

Touch + Touchless = better convenience and higher security

PAST
Single modality
convenient and secure for most
scenarios and use cases

Better convenience

Higher Security

PRESENT

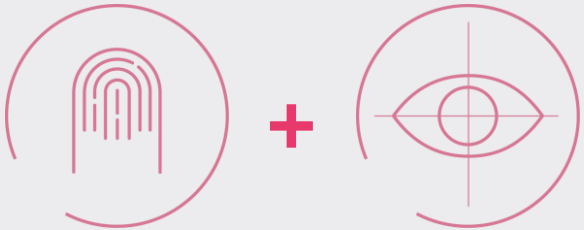
Use dual modalities but require <u>one</u> to match
To extend convenience and usage occasions e.g.:

- Wet fingers
- Gloves
- Phone on desk (backside sensor)

FUTURE

Use multi modalities require <u>both</u> to match
To improve security e.g.:

- Corporate login
- High value transactions
- Protect certain apps and services



ActiveIRIS ®

State-of-the-art performance

World's first iris recognition system

Strong IP Portfolio

A complete solution

Cost effective

Aadhaar certified

FINGERPRINTS

ActiveIRIS® Mobile

- Fast, easy-to-use
  - 20 – 40 cm distance, occluded eyes, motion blur, outdoor usage
- Safe & secure (Low FAR)
- Large demographic coverage
- Simple and inexpensive hardware
- Self Learning
- Anti Spoofing
  - Based on birefringence property of the cornea

Touchless biometrics comparison

			 2D	 3D
SECURITY	Uniqueness	1 / 1,000,000,000 IS unique for twins	1 / 10,000 *	1 / 1,000,000 NOT unique for twins
SECURITY	Hard to copy/spoof			
COMPLEXITY	Few needed components	Camera IR illuminator SW	Camera SW	Camera Pixel generator SW
COMPLEXITY	Low cost			
CONVENIENCE	Speed			
CONVENIENCE	Low power consumption			

High Medium Low

FINGERPRINTS

Summary

- For consumers
  - Fast
  - Easy to use
  - Safe & secure
- For OEMs
  - Simple
  - Easy to integrate
  - Low cost


Q&A

IN-DISPLAY

In-Display

- Market
  - Disruptive
  - Initially high-end
- Market drivers
  - Full display
  - Better user experience
  - Industrial design development

- Fingerprints' strengths
  - Leadership position in biometrics
  - Works anywhere on the display
  - Works with both LCD and OLED panels
  - Works on metal as well as glass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FARZAN GHAVANINI

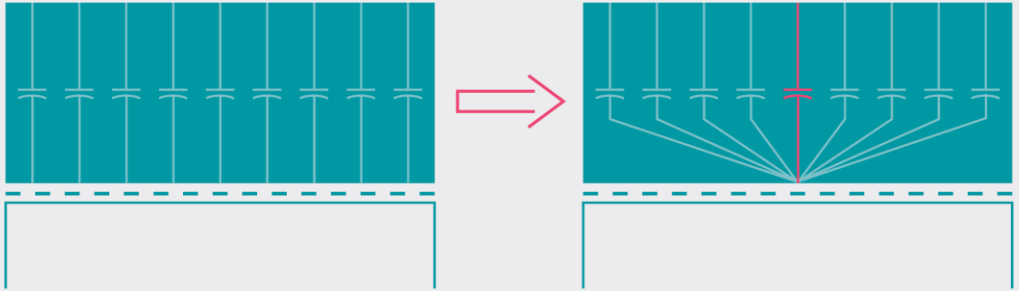
Senior Manager, Transducer Technology Development

The capacitive challenge

Thin cover layer

The **ideal** capacitive imaging holds

Thick cover layer



The **ideal** capacitive imaging does not hold

The **actual** capacitive imaging under thick glass

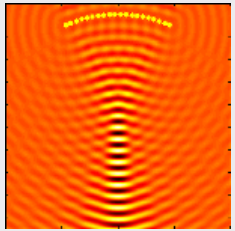
What is the root of the challenge?

Dynamic field

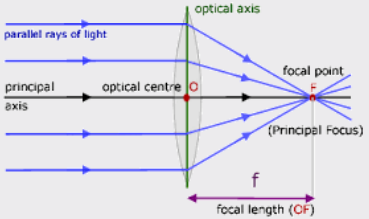
propagating wave

Sound, Light

Sound



Light

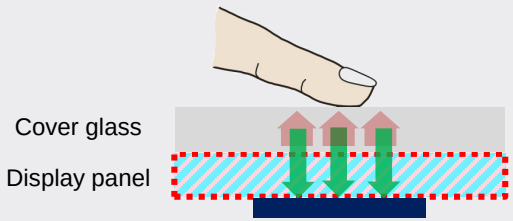


Static field

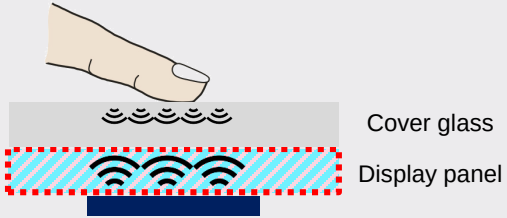
No propagating wave

Electrostatics

Conventional solutions

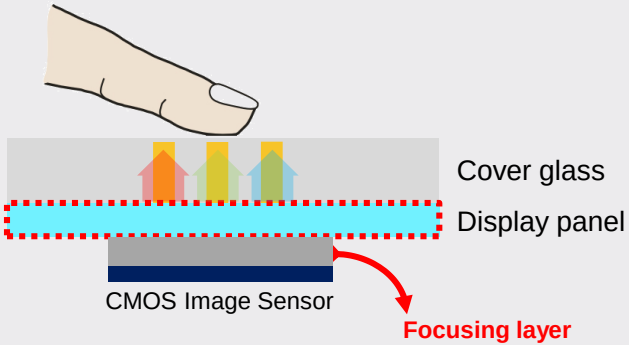


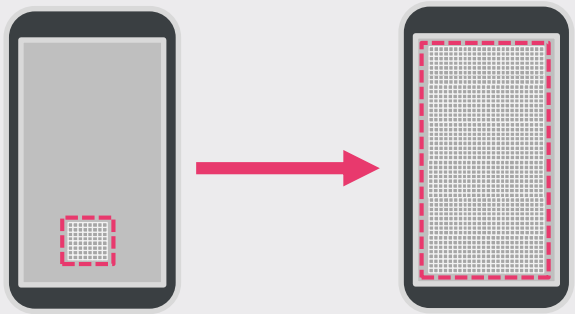
Optical Solution



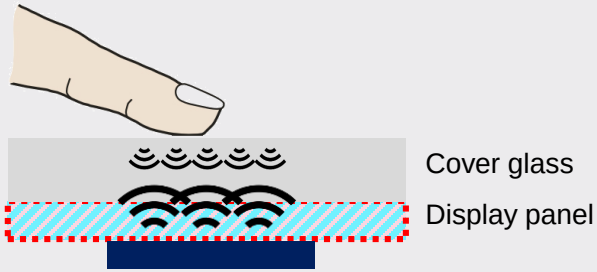
Ultrasonic Solution

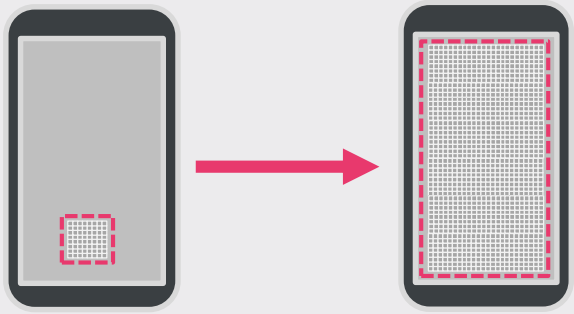
Conventional optical solution





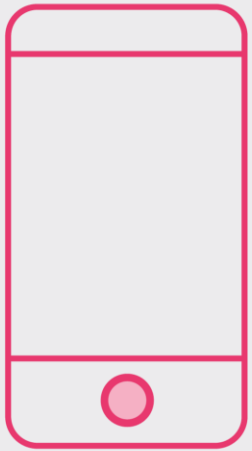
Conventional ultrasonic solution





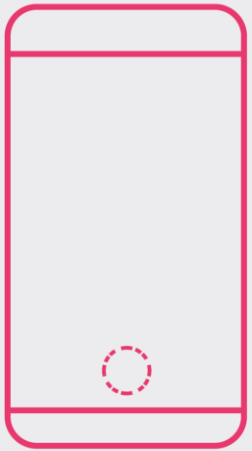
Conventional In-Display solutions

Dedicated sensor



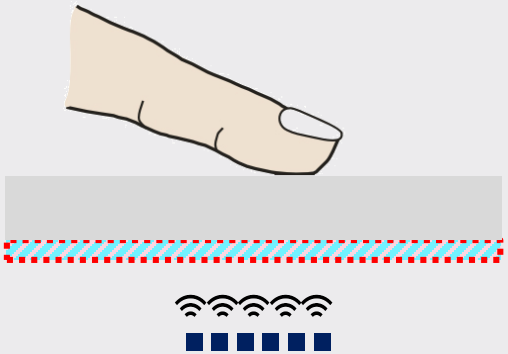
Convensional solutions

Hot zone In-Display



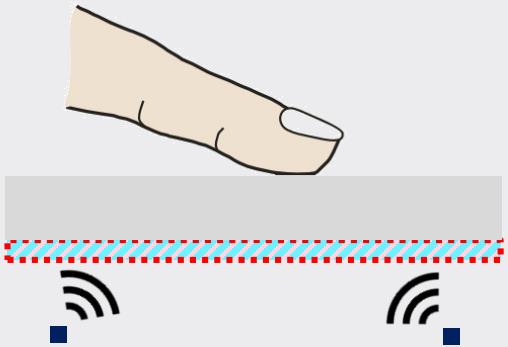
Only *OLED*

Conventional technology



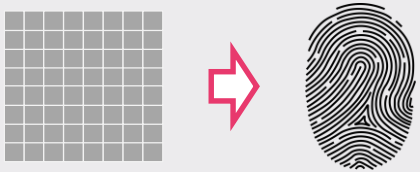
Only OLED

Fingerprints' disruptive technology

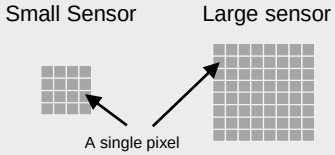


Both OLED and LCD

Conventional ultrasonic technology

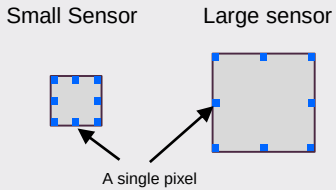


2D array of pixels directly generate a 2D image



Fingerprints' disruptive technology

A 2D image is reconstructed from 1D array of pixels



Fingerprints' disruptive ultrasonic technology

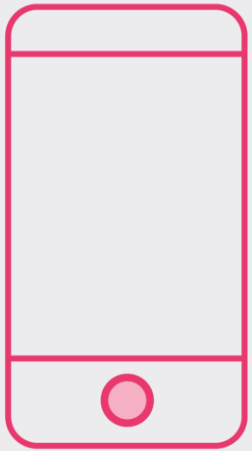
Under 20,000 µm of glass

Typical capacitive technology

Under thin (<100 µm) spray coating

In-Display alternatives

Dedicated sensor



Fingerprints' disruptive technology

Full In-Display

Summary

Fingerprints' ultrasonic sensing technology

- Is a disruptive technology which enables fingerprints to be captured anywhere on the display panel hence removing the need for a physical button.
- Is the only In-Display technology that can be used under AMOLED panels as well as LCD panel.
- Performs very well on extremely wet fingers while has a similar performance to capacitive sensors on dry fingers.
- Works under a wide range of materials including metals.
- Can perform equally well under very thick glass. Image capture has already been demonstrated under up to 20 mm of glass.

CHRISTIAN FREDRIKSON

CEO

The way forward

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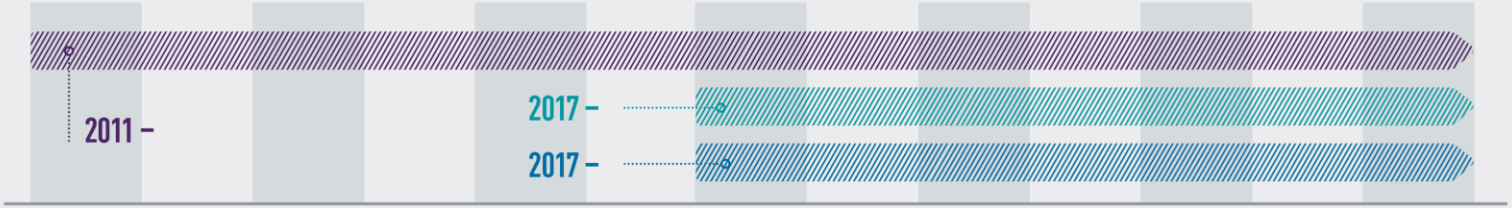


Q&A

THANK YOU!

FINGERPRINTS