



# Investor Presentation

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A hand is shown placing a coin on top of a stack of coins. To the left, a small green plant with three leaves is growing out of a stack of coins. The background is a warm, golden-brown color with a bokeh effect. A large, semi-transparent arrow points from the coin stack towards the table of contents.

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# Review of Operations

# Q2 2019 Financial Results

The EPS of Q2 2019 was 1.55 NTD, ROE was 29%

(thousands of NT dollars)

	Q2 2019	Q1 2019	Q2 2018	Change (QoQ)	Change (YoY)
Revenue	316,541	395,061	302,073	-19.9%	4.8%
Gross Margin	100%	100%	100%	-	-
Operating Expenses	187,889	201,088	183,706	-6.6%	2.3%
Operating Income	128,652	193,973	118,367	-33.7%	8.7%
Operating Margin	40.6%	49.1%	39.2%	-8.5ppts	1.4ppts
Net Income	115,098	177,151	112,193	-35.0%	2.6%
Net Margin	36.4%	44.8%	37.1%	-8.4ppts	-0.7ppts
EPS (Unit: NTD)	1.55	2.39	1.48	-35.1%	4.7%
ROE	29.0%	38.9%	23.2%	-9.9ppts	5.8ppts

# H1 2019 Financial Results

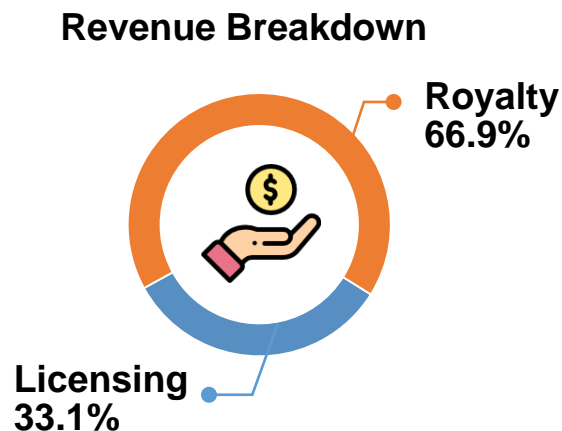
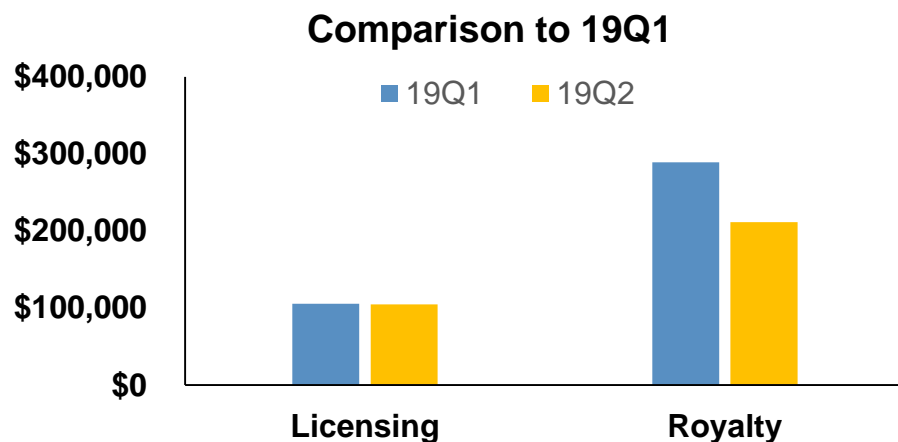
The EPS of H1 2019 was 3.94 NTD, ROE was 37%

(thousands of NT dollars)

	H1 2019	H1 2018	Change (YoY)
Revenue	711,602	676,539	5.2%
Gross Margin	100%	100%	-
Operating Expenses	388,977	376,907	3.2%
Operating Income	322,625	299,632	7.7%
Operating Margin	45.3%	44.3%	1.0ppts
Net Income	292,249	280,923	4.0%
Net Margin	41.1%	41.5%	-0.4ppts
EPS (Unit: NTD)	3.94	3.71	6.2%
ROE	36.9%	29.0%	7.9ppts

# Q2 Revenue in Different Stream

Revenue down 19.9% QoQ but up 4.8% YoY.



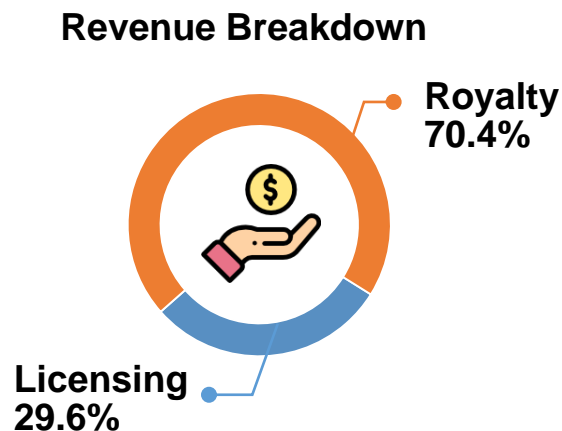
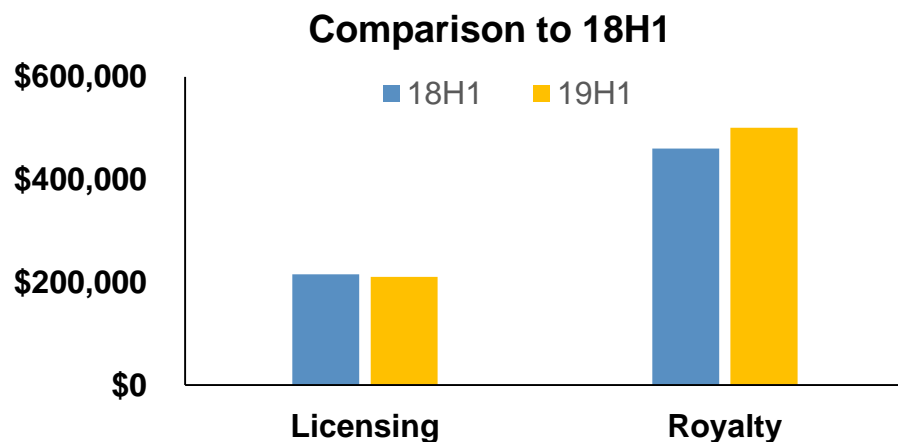
## Revenue

NT\$ Thousands	Q2 2019	Q1 2019	Q2 2018	QoQ	YoY
Licensing	104,806	105,824	101,283	-1.0%	3.5%
Royalty	211,735	289,237	200,790	-26.8%	5.5%
Total	316,541	395,061	302,073	-19.9%	4.8%



# H1 Revenue in Different Stream

Licensing revenue down 2.4%, royalty revenue up 8.7%. Total revenue up 5.2%.



## Revenue

NT\$ Thousands	H1 2019	H1 2018	YoY
Licensing	210,630	215,823	-2.4%
Royalty	500,972	460,716	8.7%
Total	711,602	676,539	5.2%

# Q2 Revenue by technology

Royalty revenue of NeoFuse has a growth of 40.3% QoQ and 109.8% YoY.

- ✓ The demand of NeoFuse continues to grow, as its licensing up 1.3% QoQ, and 53.1% YoY. Its royalty revenue increased 40.3% QoQ and 109.8% YoY.
- ✓ The royalty revenue of NeoBit decreased 36.8% QoQ and 2.6% YoY as a result of specific customer product transition. Its licensing revenue increased 38.6% QoQ but decreased 16.5% YoY.
- ✓ The licensing revenue of MTP (NeoEE+NeoMTP) decreased 48.7% QoQ and 57.3% YoY, while its royalty revenue decreased 16.8% QoQ and 47.8% YoY. The decrease in licensing and royalty revenue of NeoEE were mostly due to the decrease of revenue in fingerprint application.

Technology	Q2 2019								
	Total Revenue			Licensing Revenue			Royalty Revenue		
	% of Q2 Revenue	Change (QoQ)	Change (YoY)	% of Q2 Licensing	Change (QoQ)	Change (YoY)	% of Q2 Royalty	Change (QoQ)	Change (YoY)
NeoBit	57.1%	-31.0%	-5.1%	26.5%	38.6%	-16.5%	72.2%	-36.8%	-2.6%
NeoFuse	35.9%	14.7%	72.8%	62.7%	1.3%	53.1%	22.6%	40.3%	109.8%
NeoPUF	0.2%	100.0%	100.0%	0.6%	100.0%	100.0%	0.0%	0.0%	0.0%
NeoEE	5.5%	-35.0%	-45.7%	8.9%	-39.0%	-25.7%	3.8%	-29.5%	-58.8%
NeoMTP	1.3%	-41.3%	-69.3%	1.3%	-75.4%	-89.1%	1.4%	61.8%	88.0%

# H1 Revenue by technology

Royalty revenue of NeoFuse has a growth of 128.5% YoY.

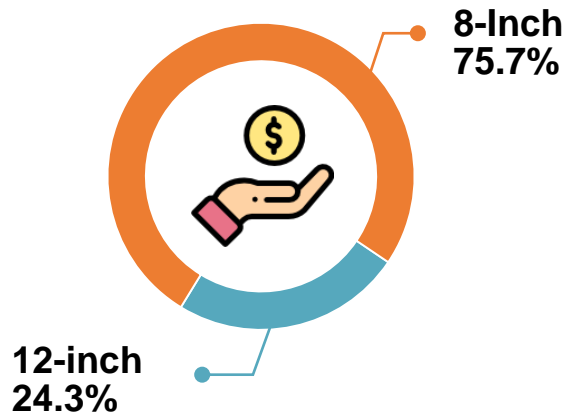
- ✓ The demand of NeoFuse continues to grow, as its licensing up 37.3% YoY. Its royalty revenue increased 128.5% YoY.
- ✓ The royalty revenue of NeoBit increased 2.8% YoY, while its licensing revenue decreased 31.5% YoY. The decrease in licensing revenue was due to specific product customer transition.
- ✓ The licensing revenue of MTP (NeoEE+NeoMTP) decreased 37.8% YoY, while its royalty revenue decreased 40.8% YoY. Their total revenue declined 39.2%.

Technology	H1 2019					
	Total Revenue		Licensing Revenue		Royalty Revenue	
	% of H1 Revenue	Change (YoY)	% of H1 Licensing	Change (YoY)	% of H1 Royalty	Change (YoY)
NeoBit	62.2%	-2.5%	22.7%	-31.5%	78.8%	2.8%
NeoFuse	29.9%	62.3%	62.0%	37.3%	16.4%	128.5%
NeoPUF	0.1%	100.0%	0.3%	100.0%	0.0%	0.0%
NeoEE	6.2%	-27.9%	11.7%	2.0%	3.8%	-47.6%
NeoMTP	1.6%	-61.7%	3.3%	-74.2%	1.0%	24.3%

# Royalty Revenue by Wafer Size

Royalty from 12 inch increased due to continuous strong demand in advanced nodes.

## Q2 Royalty Breakdown



- ✓ 12 inch royalty revenue decreased 47.1% quarter-on-quarter but increased 6.6% year-on-year.
- ✓ Royalty contribution of QoQ from 12 inch decreased due to seasonal factor of DDI related products.

## Royalty (thousands of NT dollars)

Q2 2019				H1 2019	
Wafer Size	% of Q2	Change (QoQ)	Change (YoY)	% of H1	Change (YoY)
8-Inch	75.7%	- 16.5%	5.1%	70.3%	5.9%
12-Inch	24.3%	-47.1%	6.6%	29.7%	16.2%

# Future Outlook



# eMemory Embedded Everywhere

eMemory's IP seeks to penetrate across all the applications.

## Core Tech



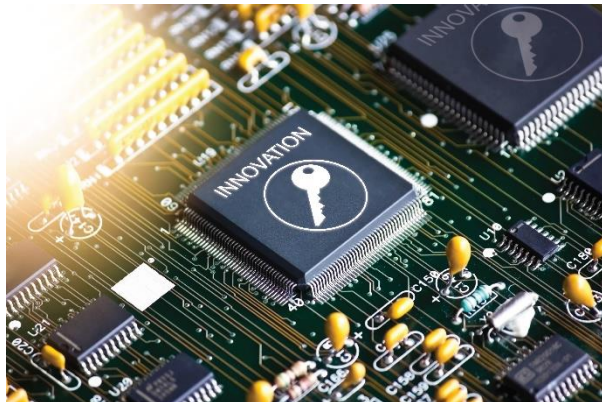
### ✓ **Product Applications:**

eMemory's IP are already applied into different scenarios, which includes PMIC, LCD driver, Sensors, RFID, OLED Driver, Connectivity IC, DTV, STB, SSD Controller, Bluetooth, TDDI, MCU, Fingerprint Sensor, Smart Meters, Surveillance, DRAM, embedded Flash and FPGA.

### ✓ **Future Target**

1. Application Processor
2. CPU
3. GPU
4. NAND Flash

## Security



### ✓ **The Future in Hardware Security Market**

The rapid growth in IoT drives the demand for the security market. All the connected devices need to build security capability quickly.

### ✓ **PUF-based Hardware Security IP:**

In order to satisfy the need for the market, eMemory developed a new series of PUF-based hardware security IP, which include  $PUF_{kengen}$ ,  $PUF_{uid}$ ,  $PUF_{trng}$ ,  $PUF_{Kst}$ ,  $PUF_{auth}$ ,  $PUF_{enc}$ .

**eMemory**

Embedded wisely, Embedded widely



# Our Perspectives for the Year

eMemory continue to create value for the industry and our shareholders.

## Licensing & Royalty



### ✓ Licensing:

- Expect sequential quarterly revenue growth of 2<sup>nd</sup> half due to new product ramping up for smart phone and non smart phone products.
- License agreements with two first tier IDMs for multiple products, which will contribute royalty growth in the future.

### ✓ Royalty :

- Largest PMIC customers will increase production further in the 2<sup>nd</sup> half and next year to increase 8-inch royalty. 12-inch royalty will continue to grow as accumulated 244 tape outs in the pipeline ready for production.
- Our first DRAM customer already started production one quarter ahead of schedule and will promote our technology to worldwide DRAMs.



## New Technology Development

- ✓ Finish first 5nm IP tape out.
- ✓ ReRAM IP has completed preliminary verification.
- ✓ Two security processor customers projects are under evaluation referred from our partnership with the largest processor IP company.
- ✓ Our PUF<sub>trng</sub>, true random number generator, is proved to be the fastest and lowest power solution.



# Q&A

# Appendix

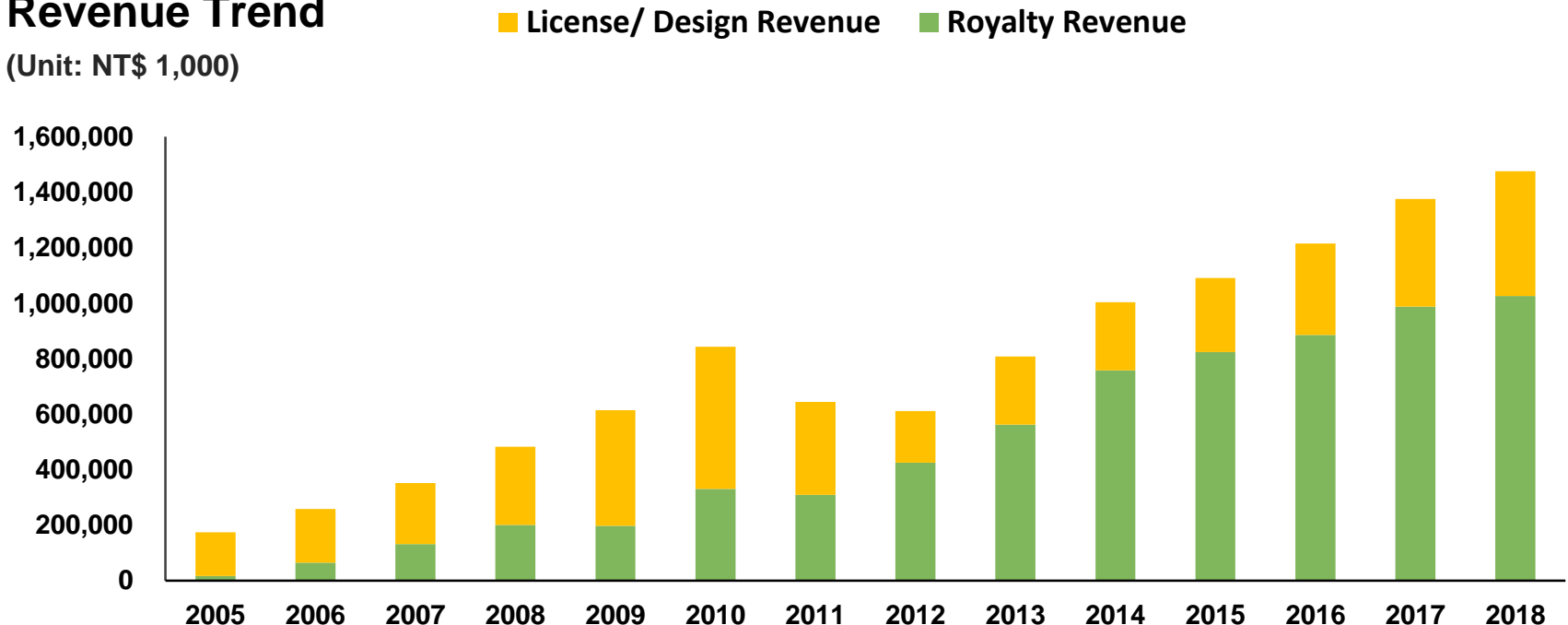


# Company Overview

eMemory is the global leader of embedded non-volatile memory IP

## Revenue Trend

(Unit: NT\$ 1,000)



**Founded**  
**In 2000**

Based in Hsinchu, Taiwan.  
IPO in 2011

**600+**  
**Patents Issued**

241 pending patents. 257  
employees with 70% R&D  
personnel

**Best IP Partner**  
**With TSMC**

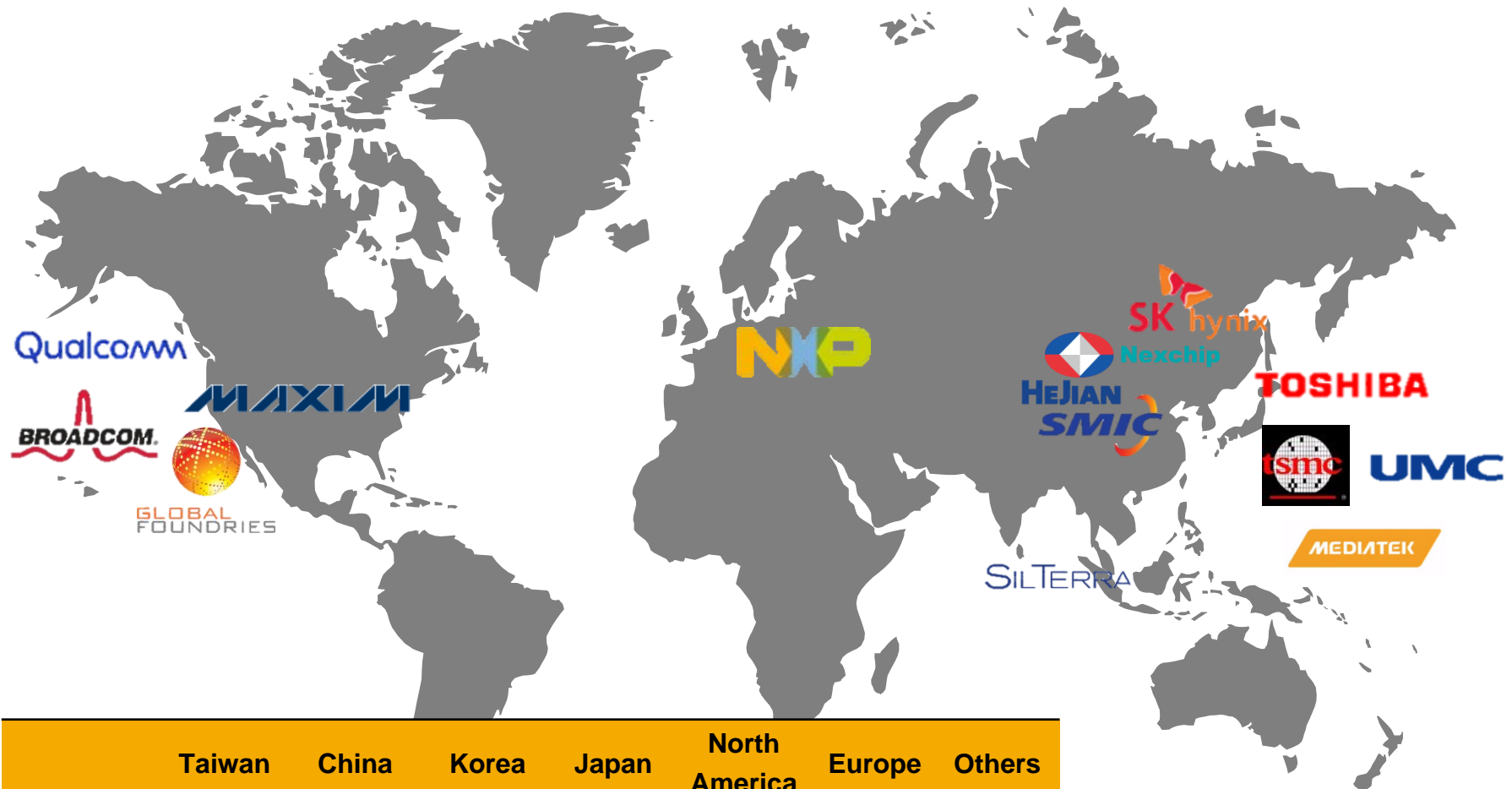
TSMC Best IP Partner Award  
since 2010.

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# Worldwide Customers

Our IP solutions are adopted by leading foundries, IDMs and fabless worldwide



	Taiwan	China	Korea	Japan	North America	Europe	Others
Foundry	4	7	4	3	1	2	1
IDM	1	0	0	7	1	1	0
Fabless	269	632	79	56	268	127	69

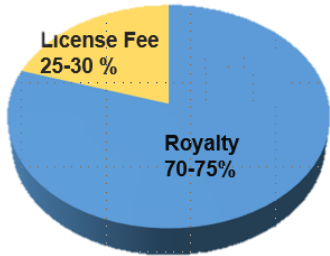
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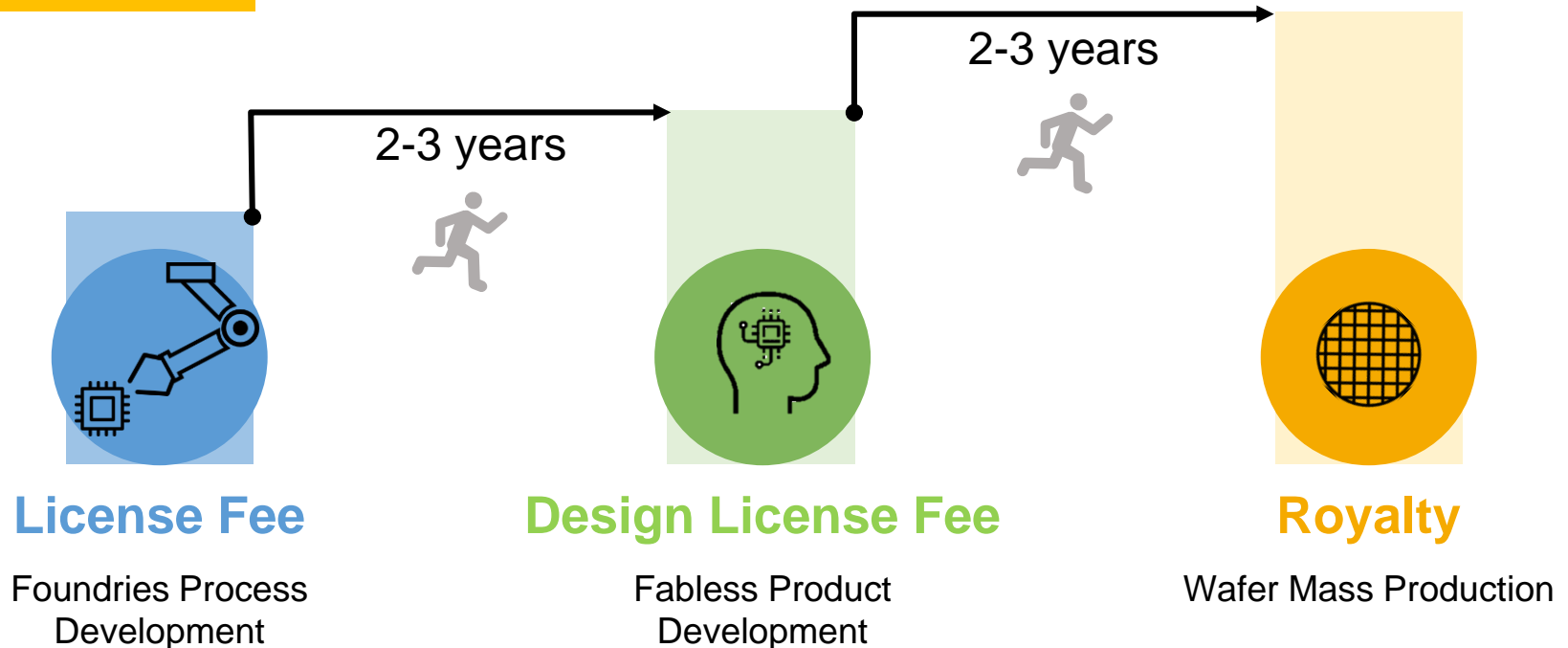
# Business Model

Recurring royalty is the backbone of our business



**Revenue  
Breakdown**

- ✓ 70-75% revenue are from royalty based on wafer production
- ✓ More adoption = more volume shipment
- ✓ More advanced node wafers = higher ASP per wafer



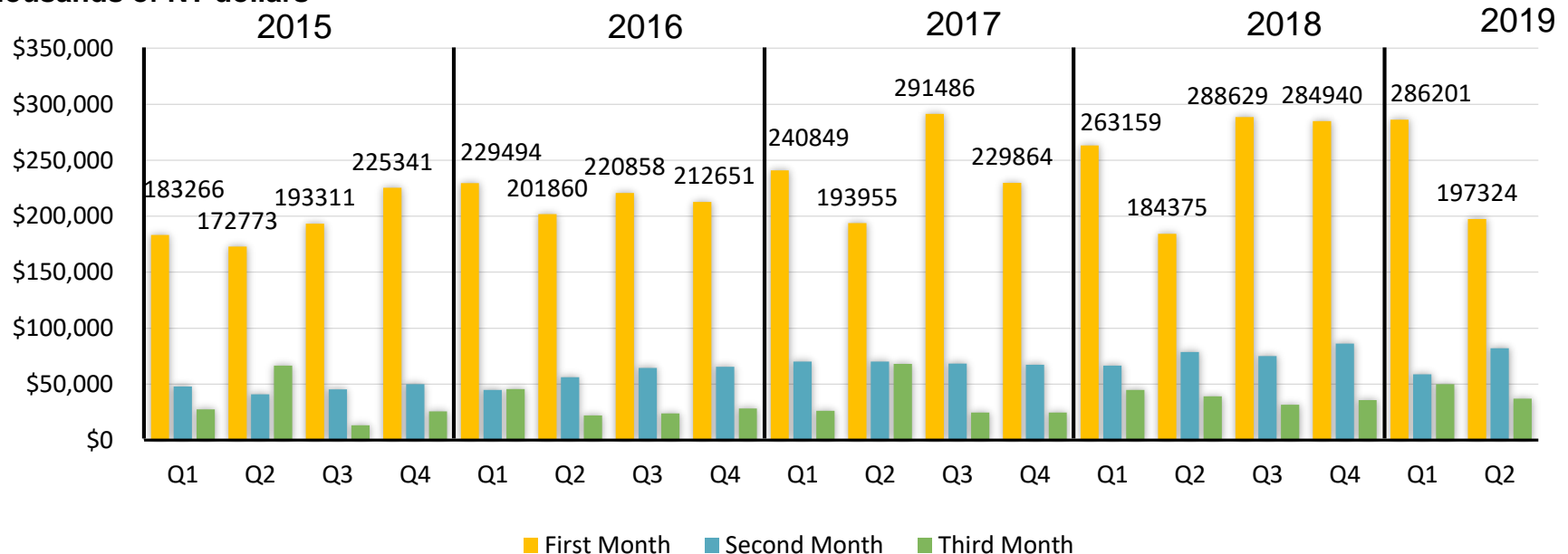


# Quarterly Revenue Pattern

eMemory's revenue are mostly received in the first month of the quarter

- ✓ 1<sup>st</sup> month: Receive **License Fees** of the month and **Royalty** from most foundries on previous quarter's wafer shipments
- ✓ 2<sup>nd</sup> month: Receive **License Fees** of the month and **Royalty** from other foundries
- ✓ 3<sup>rd</sup> month: **License Fees** Only.
- ✓ Two foundries pay royalty semiannually, reported in Jan and July Revenue.

Thousands of NT dollars



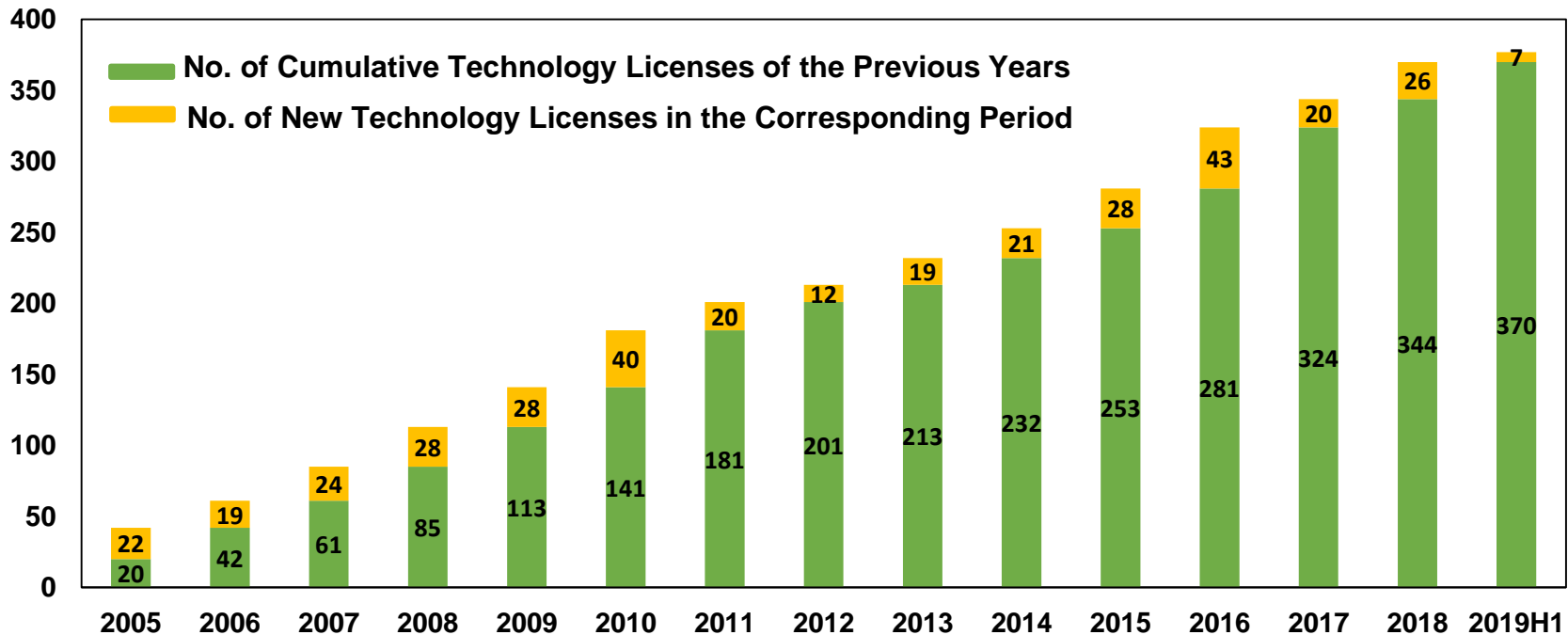
# Technology Licenses

## Cumulative technology licenses

### Number of Licenses

Year	2016	2017	2018	2019 H1
License	43	20	26	7

Note: Terms (including number of process platforms and licensing fees) for each technology license are set contractually. Payments are made according to set milestones, and there are no particular seasonal factors involved.



# New Technology under Development

Products in different process nodes

- New technologies being developed for 103 platforms by Q2 2019.
- 4 licensing contracts were signed for NeoFuse.

	5/7/10nm	12/14/16nm	22/28nm	40nm	55/65nm	80/90nm	0.11~ 0.13um	0.15~ 0.18um	>0.25um
NeoBit	-	-	-	-	1	1	8	8	1
NeoFuse	5	2	13	6	7	8	3	2	-
NeoPUF	-	-	2	2	2	-	-	-	-
NeoEE	-	-	-	-	-	2	4	6	-
NeoMTP	-	-	-	-	2	2	7	9	-

As of June 30<sup>th</sup>, 2019

# Technology Development

Developments by process node

12" Fabs	Production	Development	IP Type	Process Type
5/7/10nm	0	5	OTP, PUF	FF, FF+
12/14/16nm	3	2	OTP	FF, FF+
22/28nm	18	15	PUF, OTP	LP/ULP/ULL, HPC/HPC+, HV-OLED, DRAM, SOI
40nm	10	8	PUF, OTP, MTP	LP/ULP, HV-DDI/OLED, eFlash
55/65nm	19	12	PUF, OTP, MTP	LP/ULP, HV-DDI/OLED, CIS, eFlash, DRAM, BCD, PM
80/90nm	11	10	OTP, MTP	HV-DDI/OLED, LP, eFlash, Generic
0.13/0.11um	12	8	OTP, MTP	HV-DDI, BCD, Generic
0.18um	1	0	OTP	BCD, Generic
<b>Total</b>	<b>74</b>	<b>60</b>		

8" Fabs	Development	IP Type	Process Type
90nm	3	OTP	HV-DDI, LL, BCD
0.13/0.11um	14	PUF, OTP, MTP	HV/HV-MR, BCD, LP/LL, CIS, Green, eFlash, SOI, Generic
0.18/0.16/0.152um	25	OTP, MTP	HV/HV-MR, BCD, LP/LL, CIS, Green, Generic
0.25um	1	OTP	BCD
0.35um	0	OTP	UHV
<b>Total</b>	<b>43</b>		

Note: As of June 30<sup>th</sup>, 2019

# PUF-based Hardware Security IP

NeoPUF provide the foundation for developing eMemory's security function IPs.

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**PUFkeygen**

## Key Generations

Each device can generate its own key from embedded NeoPUF.



**PUFkeyst**

## Invisible Key Storage

NeoFuse is an invisible one time key storage memory.



**PUFuid**

## On Chip Unique ID

NeoPUF generates a unique code similar to a fingerprint ID for each chip.



**PUFtrng**

## True Random Number Generator

NeoPUF based true random number generator(tRNG) with the best randomness.



**PUFauth**

## Authentication

Authentication process can be applied by using PUF key.



**PUFenc**

## Firmware Protection

NeoPUF can protect firmware using local secure key, which is from inborn NeoPUF secret.

A hand is shown dropping a coin into a stack of coins. A small plant is growing out of the stack. The background is a warm, golden-yellow color with a blue and white brushstroke effect on the left side.

THANKS

**Embedded wisely, Embedded widely**