



# Q3 2021 Investor Conference

Nov 10<sup>th</sup>, 2021

Embedded wisely, Embedded widely

**ememory**

A hand is shown placing a coin on top of a stack of several other coins. To the left, another stack of coins has a small green plant with three leaves growing out of it. The background is a soft, out-of-focus green and yellow.

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A hand is shown dropping a coin into a stack of coins. A small green plant is growing out of the stack. The background is a blurred green and yellow bokeh.

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This presentation contains forward-looking statements, which are subject to risk factors associated with semiconductor and intellectual property business. It is believed that the expectations reflected in these statements are reasonable. But they may be affected by a variety of variables, many of which are beyond our control. These variables could cause actual results or trends to differ materially which include, but are not limited to: wafer price fluctuation, actual demand, rapid technology change, delays or failures of customers' tape-outs into wafer production, our ability to negotiate, monitor and enforce agreements for the determination and payment of royalties, any bug or fault in our technology which leads to significant damage to our technology and reputation, actual or potential litigation, semiconductor industry cycle and general economic conditions. Except as required by law, eMemory undertakes no obligation to update or revise any forward-looking statements, whether as a result of new information, future events, or otherwise.



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A hand is shown dropping a coin into a stack of coins. A small plant with three leaves is growing out of the stack. The background is a warm, golden glow. The image is partially obscured by a white, brush-stroke-like graphic on the right side.

# Review of Operations

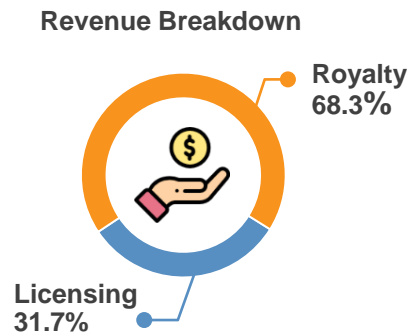
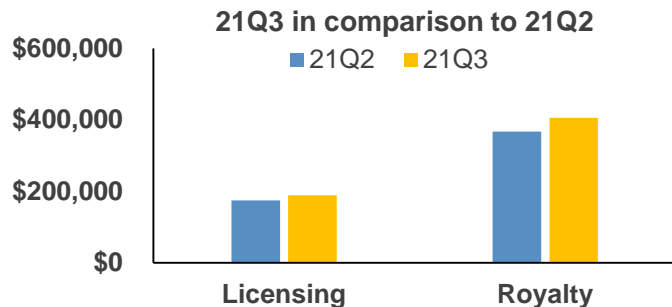
# Q3 2021 Financial Results

(thousands of NT dollars)

	Q3 2021	Q2 2021	Change (QoQ)	Q3 2020	Change (YoY)	Q1-Q3 2021	Q1-Q3 2020	Change (YoY)
Revenue	594,277	541,415	9.8%	441,259	34.7%	1,732,426	1,279,971	35.3%
Gross Margin	100%	100%	-	100%	-	100%	100%	-
Operating Expenses	277,611	258,701	7.3%	243,913	13.8%	795,335	692,740	14.8%
Operating Income	316,666	282,714	12.0%	197,346	60.5%	937,091	587,231	59.6%
Operating Margin	53.3%	52.2%	1.1ppts	44.7%	8.6ppts	54.1%	45.9%	8.2ppts
*Net Income	277,181	243,731	13.7%	168,581	64.4%	813,894	514,656	58.1%
Net Margin	46.3%	44.7%	1.6ppts	38.2%	8.1ppts	46.7%	40.2%	6.5ppts
EPS (NT\$)	3.72	3.27	13.8%	2.26	64.6%	10.92	6.92	57.8%
ROE	53.2%	50.2%	3.0ppts	38.8%	14.4ppts	52.1%	39.5%	12.6ppts

\*Net income attributable to the Shareholders of the Company

# Revenue in Different Stream



## Revenue

NT\$ Thousands	Q3 2021	Q2 2021	QoQ	Q3 2020	YoY	Q1-Q3 2021	Q1-Q3 2020	YoY
Licensing	188,667	174,559	8.1%	111,125	69.8%	540,219	335,633	61.0%
Royalty	405,610	366,856	10.6%	330,134	22.9%	1,192,207	944,338	26.2%
Total	594,277	541,415	9.8%	441,259	34.7%	1,732,426	1,279,971	35.3%

US\$ Thousands	Q3 2021	Q2 2021	QoQ	Q3 2020	YoY	Q1-Q3 2021	Q1-Q3 2020	YoY
Licensing	6,778	6,218	9.0%	3,765	80.0%	19,237	11,260	70.8%
Royalty	14,584	13,013	12.1%	11,195	30.3%	42,385	31,727	33.6%
Total	21,362	19,231	11.1%	14,960	42.8%	61,622	42,987	43.4%

# Revenue by Technology

- ✓ NeoBit royalty decreased YoY due to some PMIC and DDI products migrating into 12-inch and using NeoFuse instead. We expect the growth momentum to return once new products (legacy PMIC, auto and IoT related 8-inch applications) ramp up production.
- ✓ The royalty revenue of NeoFuse up 10.9% QoQ and up 88.7% YoY due to continuous production from WiFi 6/6E , OLED, ISP, DTV, DRAM, and others.
- ✓ Licensing revenue of MTP increased 164.6% QoQ and 367.6% YoY due to emerging memory MRAM licensing from Chinese customers.

Technology	Q3 2021								
	Total Revenue			Licensing Revenue			Royalty Revenue		
	% of Q3 Revenue	Change (QoQ)	Change (YoY)	% of Q3 Licensing	Change (QoQ)	Change (YoY)	% of Q3 Royalty	Change (QoQ)	Change (YoY)
NeoBit	38.8%	3.7%	-2.6%	20.7%	-22.0%	56.5%	47.3%	11.2%	-9.5%
NeoFuse	49.7%	3.9%	68.2%	49.5%	-8.7%	36.2%	49.7%	10.9%	88.7%
PUF-Based	0.5%	34.7%	-54.9%	1.5%	34.2%	-55.1%	*0.0%	100.0%	100.0%
MTP	11.0%	101.0%	187.8%	28.3%	164.6%	367.6%	3.0%	-2.7%	6.3%

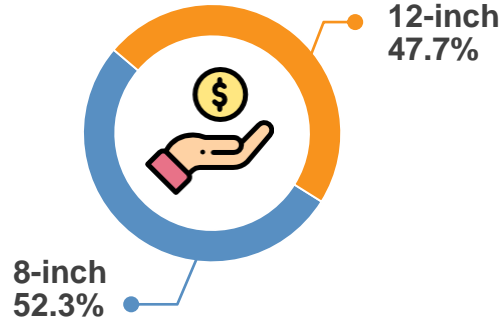
Technology	Q1-Q3 2021				
	Total Revenue		Licensing Revenue		Royalty Revenue
	% of Q1-Q3 Revenue	Change (YoY)	% of Q1-Q3 Licensing	Change (YoY)	% of Q1-Q3 Royalty
NeoBit	40.0%	1.9%	21.6%	67.7%	48.5%
NeoFuse	50.0%	64.0%	53.0%	26.2%	48.6%
PUF-Based	0.6%	8.0%	1.9%	8.0%	0.0%
MTP	9.4%	164.0%	23.5%	328.7%	2.9%

\*We received PUF royalty this quarter, however, it was proportionally lower compared to other technologies, and therefore rounded to 0%



# Royalty Revenue by Wafer Size

## Q3 Royalty Breakdown



- ✓ 8-inch wafers contributed 52.3% of royalty, up 9.0% sequentially and 6.7% YoY due to 8-inch applications expanding into automotive and IoT related applications.
- ✓ 12-inch wafers contributed 47.7% of royalty, up 12.3% QoQ and 47.4% YoY due to continuous production from WiFi 6/6E, OLED, ISP, DTV, DRAM, and more.

Wafer Size	Q3 2021			Q1-Q3 2021	
	% of Q3	Change (QoQ)	Change (YoY)	% of Q1-Q3	Change (YoY)
8-Inch	52.3%	9.0%	6.7%	53.4%	7.5%
12-Inch	47.7%	12.3%	47.4%	46.6%	57.9%

A hand is shown dropping a coin into a stack of coins. A small green plant with three leaves is growing out of the stack. The background is a warm, golden-yellow color. The image is framed by a white, brush-stroke-like border on the right side.

# Future Outlook

# eMemory Embedded Everywhere

- ✓ eMemory's IP seeks to penetrate across all the applications



## ✓ Product Applications:

eMemory's IP are already applied into different applications, which includes PMIC, LCD driver, Sensors, RFID, OLED Driver, Connectivity IC, DTV, STB, SSD Controller, Bluetooth, TDDI, MCU, Finger-print Sensor, Smart Meters, Surveillance, ISP, CIS, DRAM, Embedded Flash, IoT, AI and FPGA.

## ✓ Future Target:

AP, GPU, CPU, DPU, and Autonomous Driving



## ✓ Product Application with PUF-based Security IP:

PUF-based security IP are being applied in AI, IoT, AIoT, GPS, PMIC and MCU.

## ✓ PUF-based Security Solutions:

Automotive, Communication, Networking and Vertical market.

# Our Perspectives

## Licensing & Royalty



### ✓ **Licensing:**

- Licensing revenue will grow since demand remains strong for NeoFuse, NeoBit, PUF-based solutions, and MTP. We expect licensing revenue to continue its growth this in Q4 and beyond.

### ✓ **Royalty:**

- 8-inch royalties will continue to grow due to the demand and content increase for PMIC, MCU, Fingerprint, and Sensor-related in 5G, Automotive, and IoT-related applications.
- 12-inch royalties will have strong growth as customers are ramping up production for TDDI, OLED, ISP, DTV, STB, WiFi 6/6E, Bluetooth, Ethernet, Switch, TWS, DRAM, and others.
- Royalty contribution from 16nm and 7nm started to kick in during Q4.
- Several major foundries have expanded 28/22nm production capacity and we have accumulated more than 155 new tape-outs at this process node, driving momentum for the growth of royalties in the future.

# Our Perspectives

## ✓ New Business Development:

- NeoFuse and NeoPUF in advanced processes, is being adopted for AI, HPC and Automotive applications, especially in 7nm and 6nm nodes.
- Business activities for PUF-based security solutions are in progress in various applications. PUFrt and PUFcc have also been adopted by several customers across various applications.
- Our collaboration with ARM expands from IoT into CPU security architecture.
- eMemory has received the TSMC OIP Partner of the Year Award for the twelfth year in a row, demonstrating the trust our partners have in us.

## ✓ New IP Technology Development:

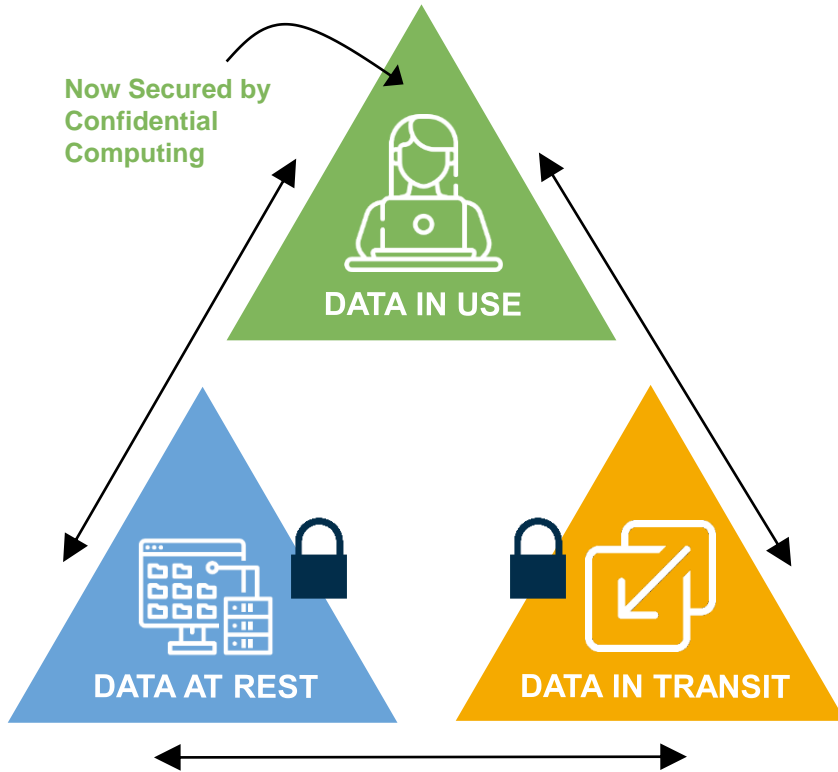
- NeoFuse is qualified on TSMC's N6 process. This security-enhanced OTP combines NeoFuse with NeoPUF to protect data, targeting various applications.
- ReRAM IP has been qualified in the UMC 40nm process. eMemory is one of the world's first companies to provide this emerging memory and offer more comprehensive solutions for Automotive, Edge Computing, AI and AIoT markets. We will extend ReRAM technology to more advance nodes and specialty processes.
- PUF-based solutions are under development for implementation in WiFi 6/6E for AIoT edge devices and AI image processors.



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

# Confidential Computing Architecture

# Why Confidential Computing?



## Confidential Computing Architecture

- ✓ There is a need for **Data Confidentiality** to protect
  - Data at Rest
  - Data in Transit
  - Data in Use
- ✓ **Data at Rest** and **Data in Transit** can be protected by Encryption through existing security protocols
- ✓ **Data in Use** is very difficult to protect, for example, Processors can only process Plain data, not Encrypted Data –

So We Need Confidential Computing Architecture

# Introduction of Confidential Computing (I)

- ✓ From Non-Confidential Computing to Confidential Computing: To encrypt program code and data

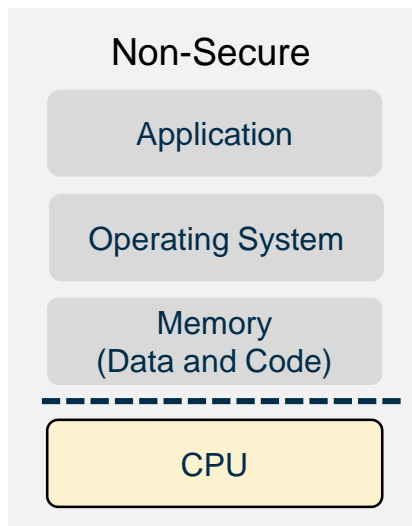


Figure 1

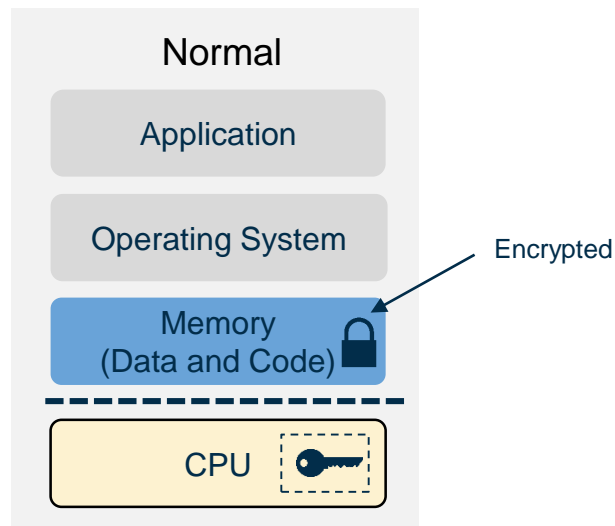


Figure 2



# Introduction of Confidential Computing (II)

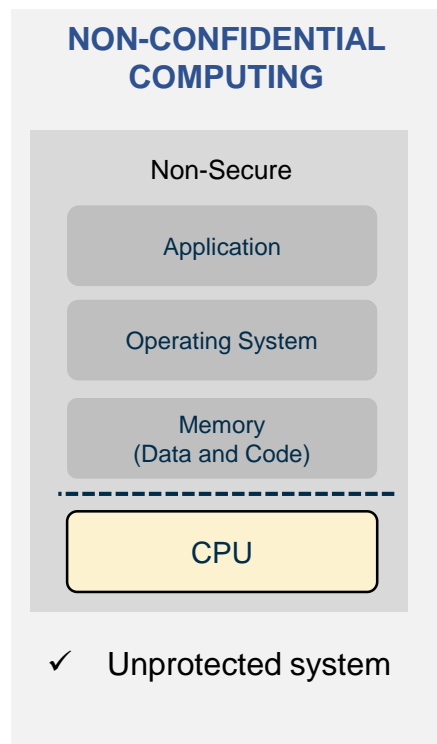


Figure 1

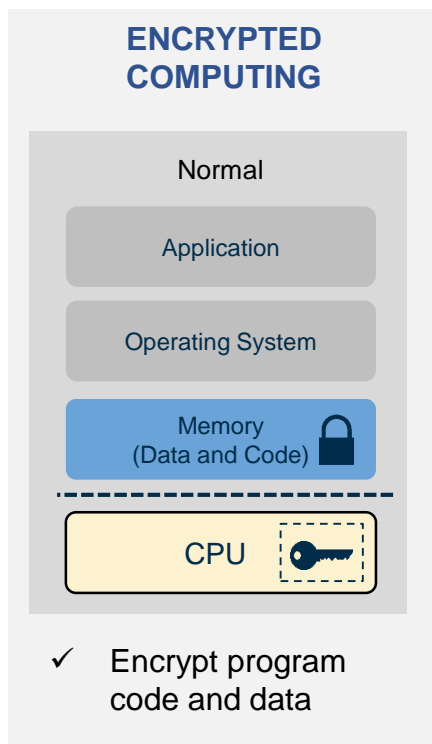


Figure 2

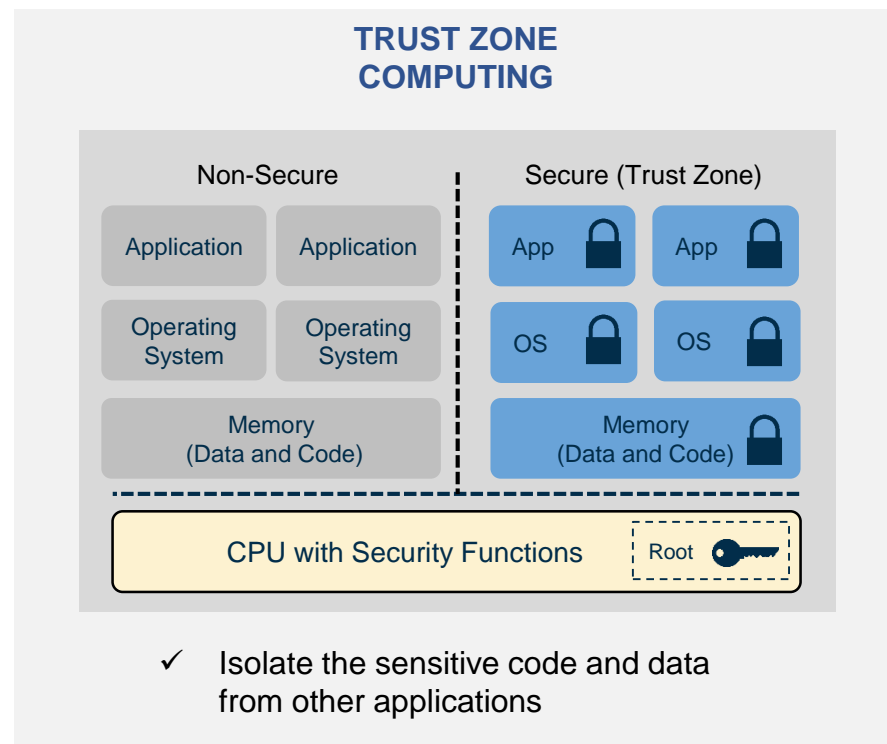


Figure 3

# Introduction of Confidential Computing (III)

## CONFIDENTIAL COMPUTING ARCHITECTURE

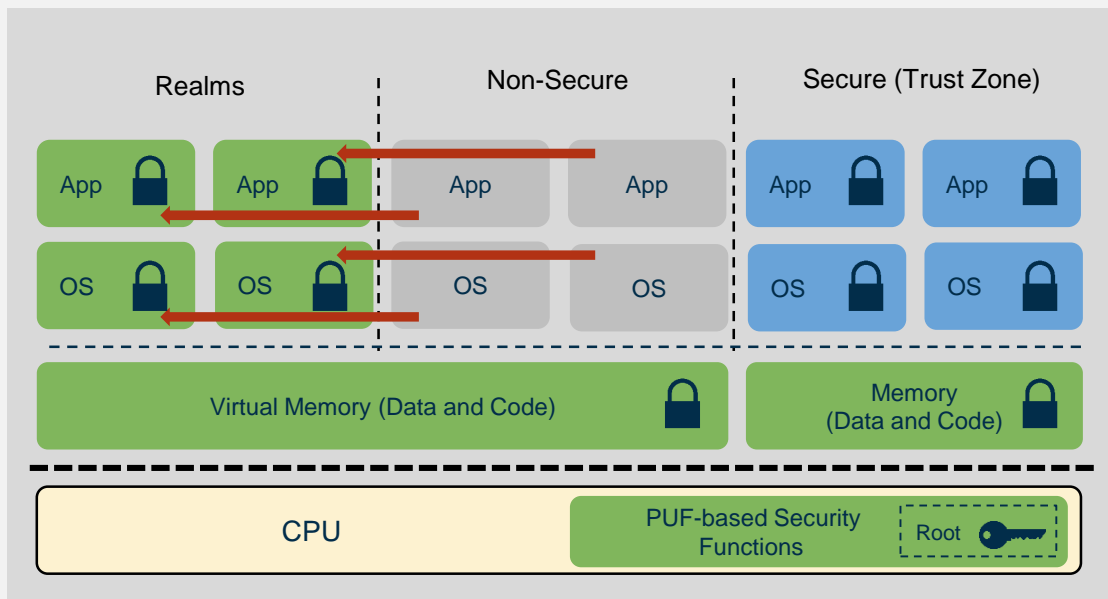



Figure 4

- ✓ Even in the Secure Enclave, it can still share the data in Virtual Memory
- ✓ PUF enables the Memory Tagging to protect unauthorized access

# How can PUF help Confidential Computing?


Now Secured by Confidential Computing



**DATA IN USE**

**PUF Key for Tagging**

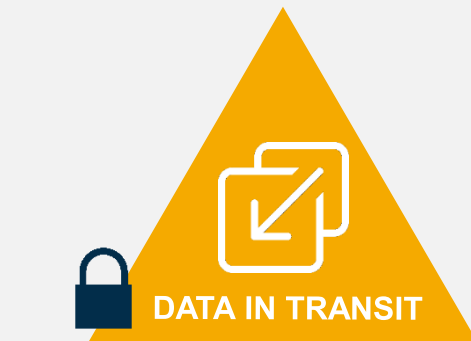
Ensuring data and code in Virtual Memory will not be used by unauthorized parties



**DATA AT REST**

**PUF Key for Encryption**

Protect Data and Code at Rest



**DATA IN TRANSIT**

**PUF Key for Encryption**

Protect Data and Code in Transit



# Q&A



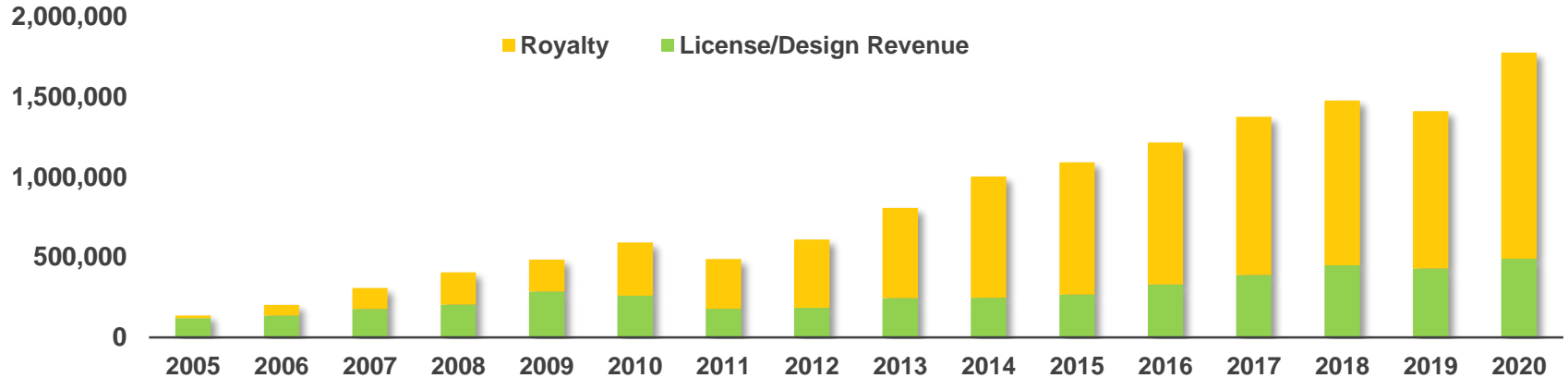
# Appendix

# 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. Over 37M wafers  
shipped.

**900+  
Patents Issued**

212 pending patents. 292  
employees with 67% R&D  
personnel.

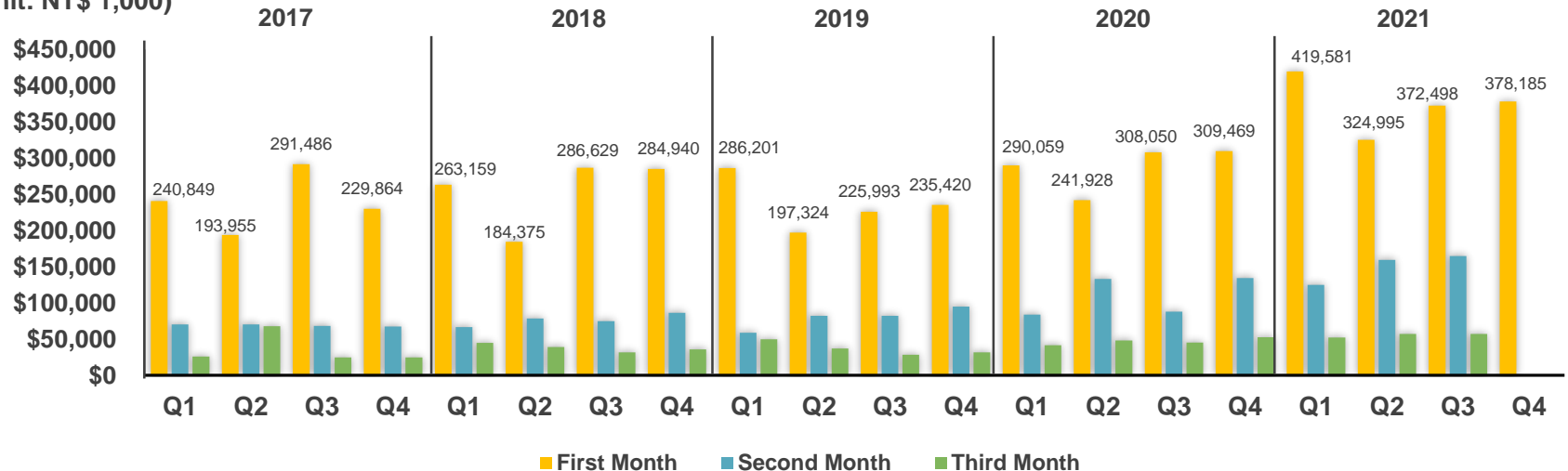
**Best IP Partner  
With TSMC**

TSMC Best IP Partner Award  
since 2010.

# Quarterly Revenue Pattern

- ✓ 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.

(Unit: NT\$ 1,000)



# Worldwide Customers

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

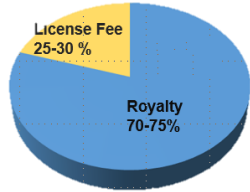
Country	Foundry	IDM	Fabless
Taiwan	4	1	310
China	8	0	896
Korea	4	0	91
Japan	4	7	69
North America	1	1	315
Europe	2	1	194
Others	1	0	78



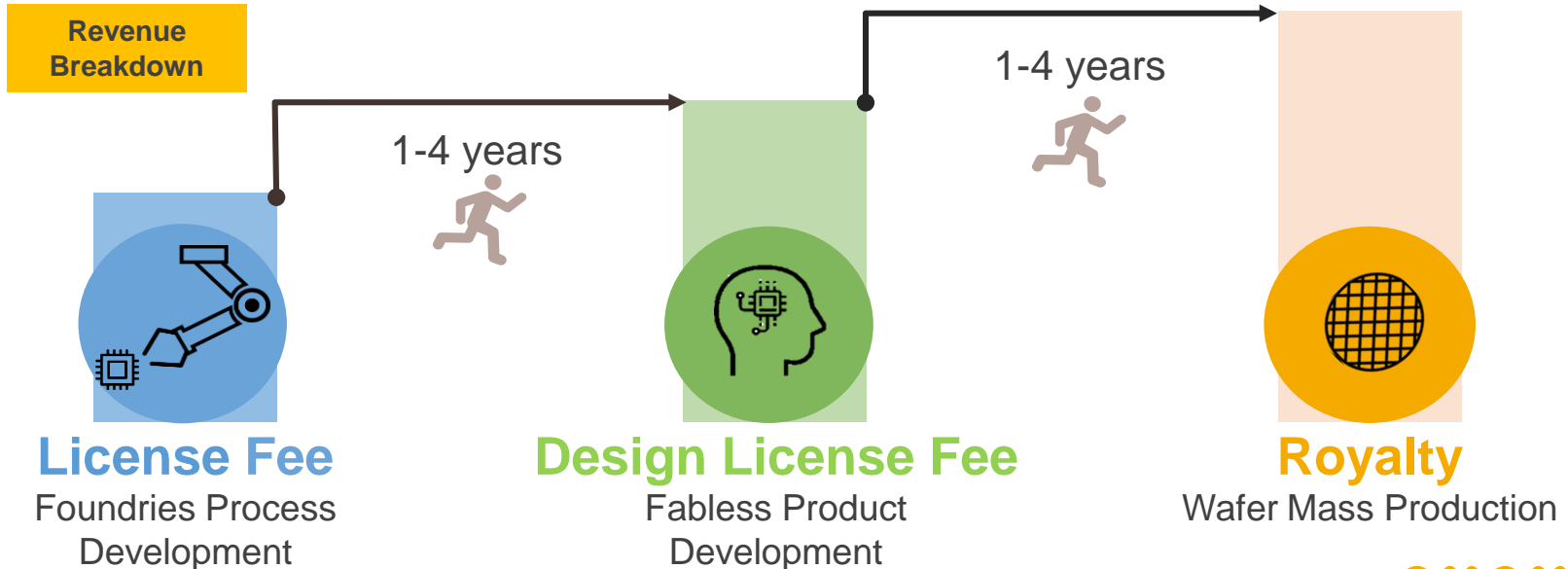


# Business Model

- ✓ Recurring royalty is the backbone of our business



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

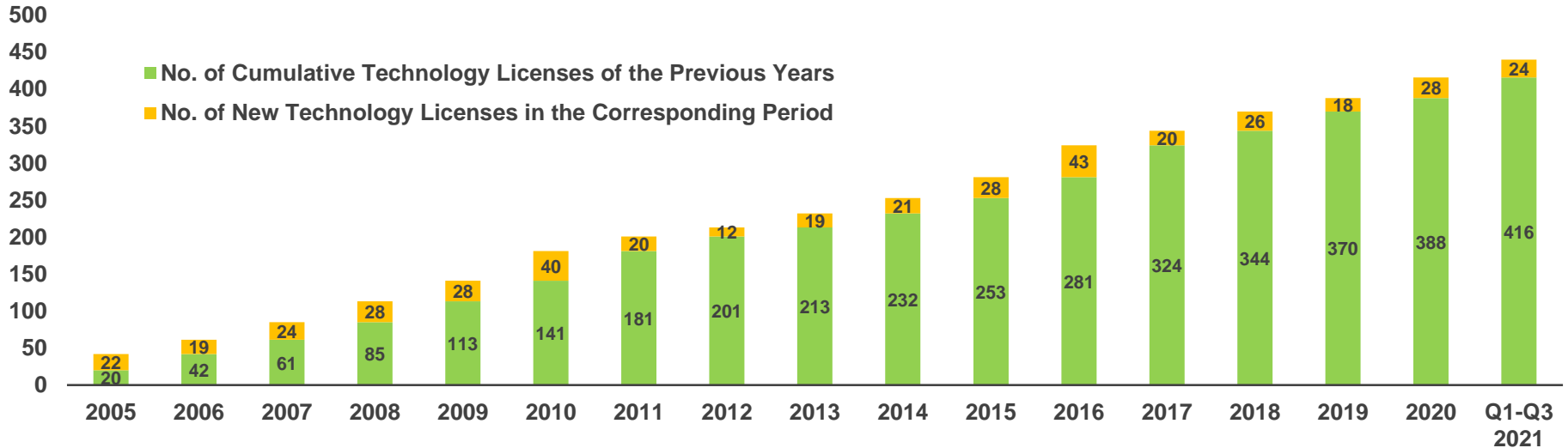


# Technology Licenses

Number of Licenses

Year	2016	2017	2018	2019	2020	Q1-Q3 2021
License	43	20	26	18	28	24

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

- ✓ New technologies are being developed for **108** platforms by Q3 2021.
- ✓ **10** licensing contracts were signed.

Technology	5/6nm	7/10nm	12/16nm	22/28nm	40nm	55/65nm	80/90nm	0.11~ 0.13um	0.15~ 0.18um	>0.25um
NeoBit	-	-	-	-	-	1	2	8	11	1
NeoFuse	1	1	5	10	2	12	7	2	1	-
PUF-Based	1	-	-	-	2	1	-	-	-	-
MTP	-	-	-	2	-	6	3	13	16	-

Note: As of Sep 30<sup>th</sup>, 2021

# Technology Development

✓ Developments by process nodes

12" Fabs	Production	Development	IP Type	Process Type
5/6nm	2	2	OTP, PUF	FF
7/10nm	2	1	OTP, PUF	FF, FF+
12/16nm	5	5	OTP, PUF	FF, FF+, FFC, FFC+, LPP
22/28nm	37	12	OTP, PUF, MTP	LP/ULP/ULL, HPC/HPC+, HPM, DRAM, SOI, ReRAM
40nm	17	4	OTP, PUF	LP/ULP, E-Flash, HV
55/65nm	29	20	OTP, PUF, MTP	LP/ULP, E-Flash, HV-DDI/OLED, DRAM, CIS, BCD
80/90nm	21	9	OTP, MTP	HV-DDI/OLED, Generic ,BCD, CIS
0.11/0.13um	18	4	OTP, MTP	HV-DDI, BCD, Generic
0.18um	1	4	OTP	BCD, Generic, Green
<b>Total</b>	<b>132</b>	<b>61</b>		

8" Fabs	Development	IP Type	Process Type
90nm	3	OTP	MM, BCD
0.11/0.13um	19	OTP, MTP	HV/HV-MR, BCD, Green, Flash
0.152/0.16/0.18um	24	OTP, MTP	HV/HV-MR, BCD, Generic
0.25um	1	OTP	MM
0.35um	0	-	-
<b>Total</b>	<b>47</b>		

Note: As of Sep 30<sup>th</sup>, 2021

A hand is shown dropping a coin into a stack of coins. A small green plant with three leaves is growing out of the stack. The background is a warm, golden-yellow color. The image is framed by a white, brush-stroke-like border.

**THANKS**

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