Q3 2019 Investor Conference

Nov 13th, 2019

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IPR Notice

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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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Review of Operations

Q3 2019 Financial Results

The EPS of Q3 2019 was 1.62 NTD, ROE was 29.1%.

(thousands of NT dollars)

	Q3 2019	Q2 2019	Q3 2018	Change (QoQ)	Change (YoY)
Revenue	336,587	316,541	393,225	6.3%	-14.4%
Gross Margin	100%	100%	100%	-	-
Operating Expenses	197,399	187,889	204,342	5.1%	-3.4%
Operating Income	139,188	128,652	188,883	8.2%	-26.3%
Operating Margin	41.4%	40.6%	48.0%	0.8ppts	-6.6ppts
Net Income	120,170	115,098	168,572	4.4%	-28.7%
Net Margin	35.7%	36.4%	42.9%	-0.7ppts	-7.2ppts
EPS (Unit: NTD)	1.62	1.55	2.23	4.5%	-27.4%
ROE	29.1%	29.0%	34.8%	0.1ppts	-5.7ppts

Q1-Q3 2019 Financial Results

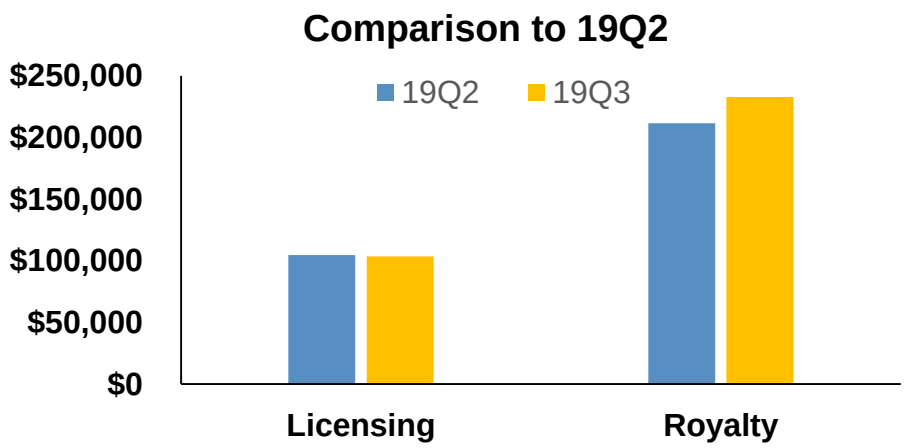
The EPS of Q1-Q3 2019 was 5.56 NTD, ROE was 33.3%.

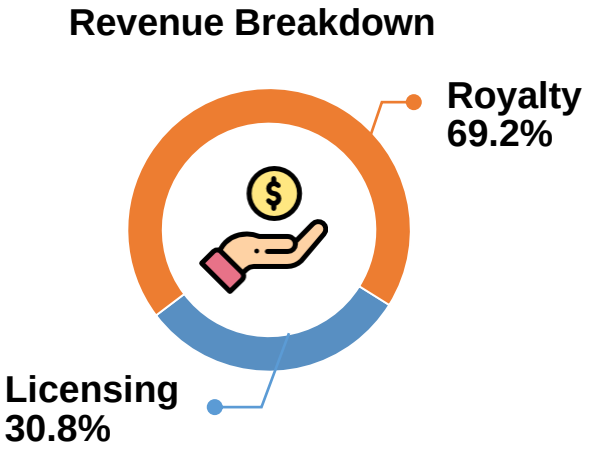
(thousands of NT dollars)

	Q1-Q3 2019	Q1-Q3 2018	Change (YoY)
Revenue	1,048,189	1,069,764	-2.0%
Gross Margin	100%	100%	-
Operating Expenses	586,376	581,249	0.9%
Operating Income	461,813	488,515	-5.5%
Operating Margin	44.1%	45.7%	-1.6ppts
Net Income	412,419	449,495	-8.2%
Net Margin	39.3%	42.0%	-2.7ppts
EPS (Unit: NTD)	5.56	5.93	-6.2%
ROE	33.3%	30.9%	2.4ppts

Revenue in Different Stream

Revenue up 6.3% QoQ but down -14.4% YoY.





Revenue

NT$ Thousands	Q3 2019	Q2 2019	Q3 2018	QoQ	YoY	Q1-Q3 2019	Q1-Q3 2018	YoY
Licensing	103,689	104,806	109,257	-1.1%	-5.1%	314,319	325,080	-3.3%
Royalty	232,898	211,735	283,968	10.0%	-18.0%	733,870	744,684	-1.5%
Total	336,587	316,541	393,225	6.3%	-14.4%	1,048,189	1,069,764	-2.0%

Q3 Revenue by Technology

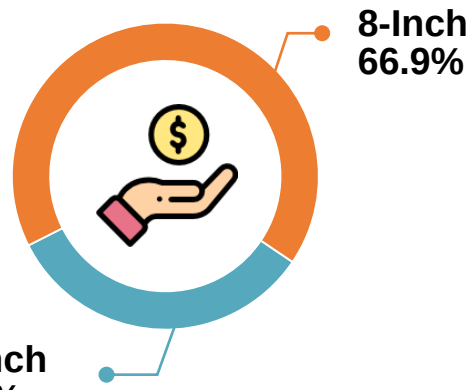
The total revenue of NeoFuse has a growth of 28.5% YoY.

- ✓ The licensing revenue of NeoFuse decreased 26.9% QoQ but increased 25.8% YoY. Its royalty revenue decreased 2.2% QoQ but increased 31.4% YoY.
- ✓ The royalty revenue of NeoBit increased 16.6% QoQ but decreased 21.6% YoY. Its licensing revenue increased 30.9% QoQ but decreased 1.1% YoY.
- ✓ The licensing revenue of MTP (NeoEE+NeoMTP) increased 79.9% QoQ but decreased 43.7% YoY, while its royalty revenue decreased 28.7% QoQ and 62.9% YoY. The decrease is due to NeoEE's product transition of one of our fingerprint's customer, and specific customers' wafer loading adjustment.

Technology	Q3 2019								
	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	63.8%	18.8%	-18.7%	35.0%	30.9%	-1.1%	76.6%	16.6%	-21.6%
NeoFuse	28.2%	-16.4%	28.5%	46.4%	-26.9%	25.8%	20.1%	-2.2%	31.4%
NeoPUF	0.0%	-100.0%	0.0%	0.0%	-100.0%	0.0%	0.0%	0.0%	0.0%
NeoEE	5.4%	5.4%	-48.9%	11.3%	25.0%	-27.8%	2.8%	-17.9%	-66.5%
NeoMTP	2.6%	104.5%	-54.9%	7.3%	458.1%	-58.0%	0.5%	-58.0%	-16.4%

Royalty Revenue by Wafer Size

Q3 Royalty Breakdown



- ✓ The royalty of 12-inch wafer increased 49.5% QoQ, but decreased 34.2% YoY.
- ✓ The increased in QoQ was due to semiannual payments by two foundries reported in January and July.
- ✓ The decreased in YoY was due to inventory adjustment by DDI customers.

Royalty (thousands of NT dollars)

Wafer Size	Q3 2019			Q1-Q3 2019	
	% of Q3	Change (QoQ)	Change (YoY)	% of Q1-Q3	Change (YoY)
8-Inch	66.9%	- 2.7%	-6.6%	69.2%	1.7%
12-Inch	33.1%	49.5%	-34.2%	30.8%	-7.9%

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

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:**
  To satisfy the market needs, eMemory developed a new series of PUF-based hardware security IP, including PUFkeygen, PUFuid, PUFtrng, PUFkeyst, PUFauth, PUFenc, PUFflash.

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Our Perspectives

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

Licensing & Royalty

- ✓ Expect revenue to grow on a sequential basis and return to accelerated growth in 2020.
- ✓ Licensing:
  - NeoFuse and NeoPUF will continue to grow in licensing due to increasing advanced technology platforms and more comprehensive PUF-related IP portfolios
- ✓ Royalty:
  - Royalty will grow, driven by OLED and PMIC due to 5G, higher asp, and market share gain into IDMs.
  - New applications ie. Multimedia related, ISP, Networking, and DRAM will continue to grow our royalty in the coming year.

New Application & Technology Development

- ✓ NeoPUF has a distinctive progress in the most advanced process SoC, ultra-low power processing IoT chip applications, and embedded flash platform.
- ✓ In addition to the 5nm technology platform, ReRAM, and the largest IP company cooperation project, we kicked off 6nm and 5nm plus (N5P) technology platform development, at the same pace with our leading foundry partner.
- ✓ Our PUFtrng, True Random Number Generator was proved to be the fastest and lowest power-consumption random number generator in the industry.

Q&A

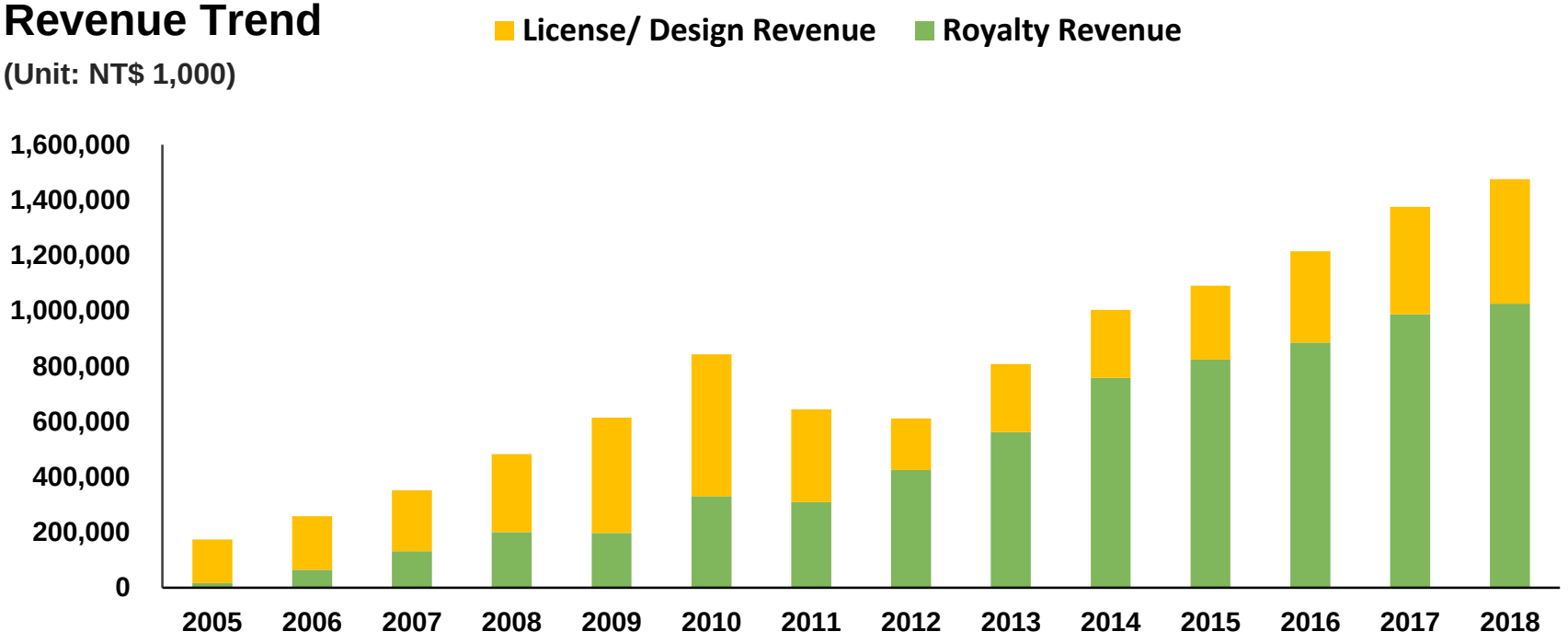
Appendix

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

249 pending patents. 264 employees with 68% R&D personnel

Best IP Partner

With TSMC

TSMC Best IP Partner Award since 2010.

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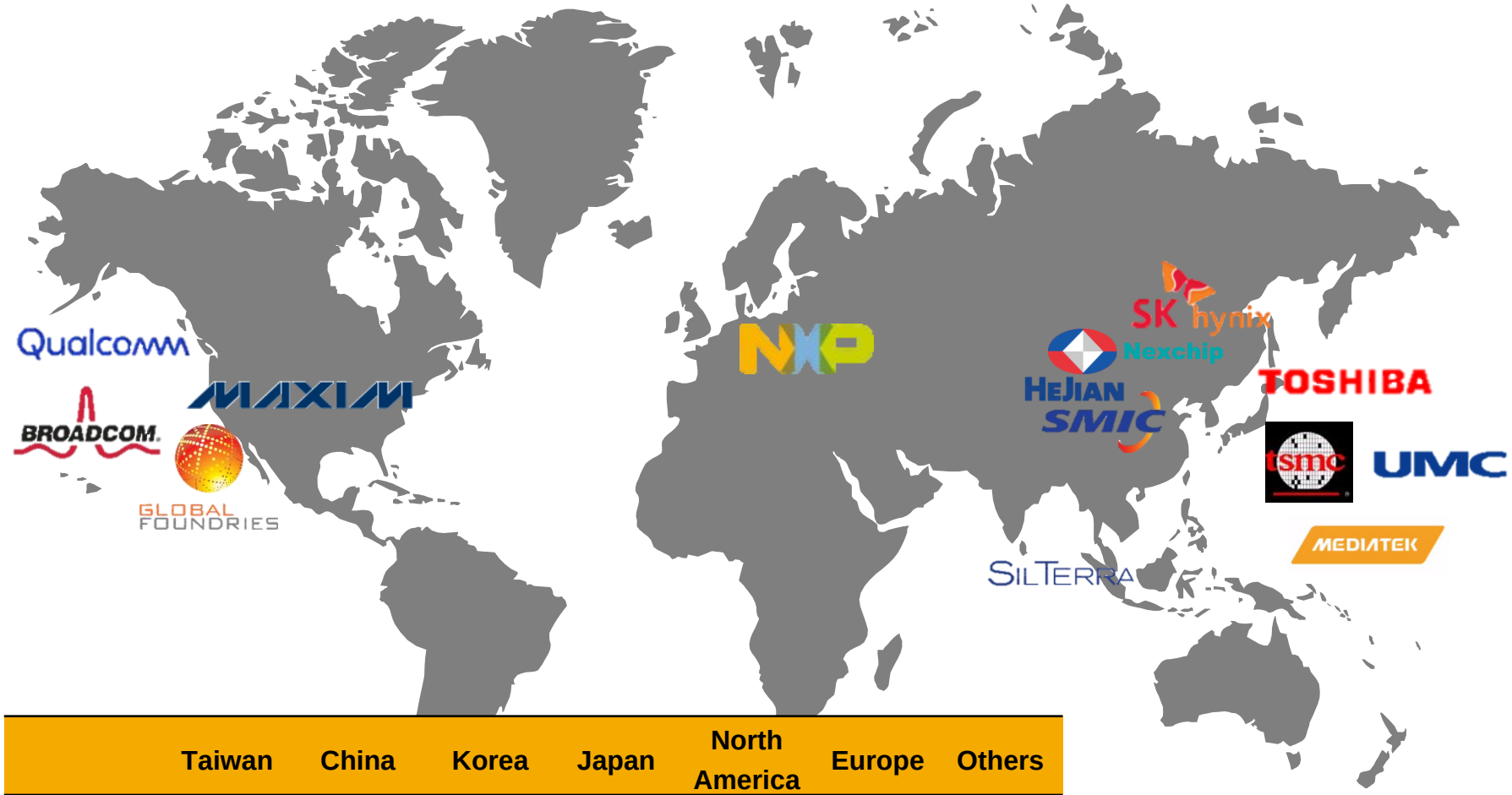
Worldwide Customers

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



	Taiwan	China	Korea	Japan	North America	Europe	Others
Foundry	4	7	4	4	1	2	1
IDM	1	0	0	7	1	1	0
Fabless	282	688	83	59	278	137	60

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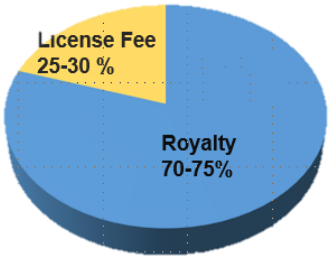
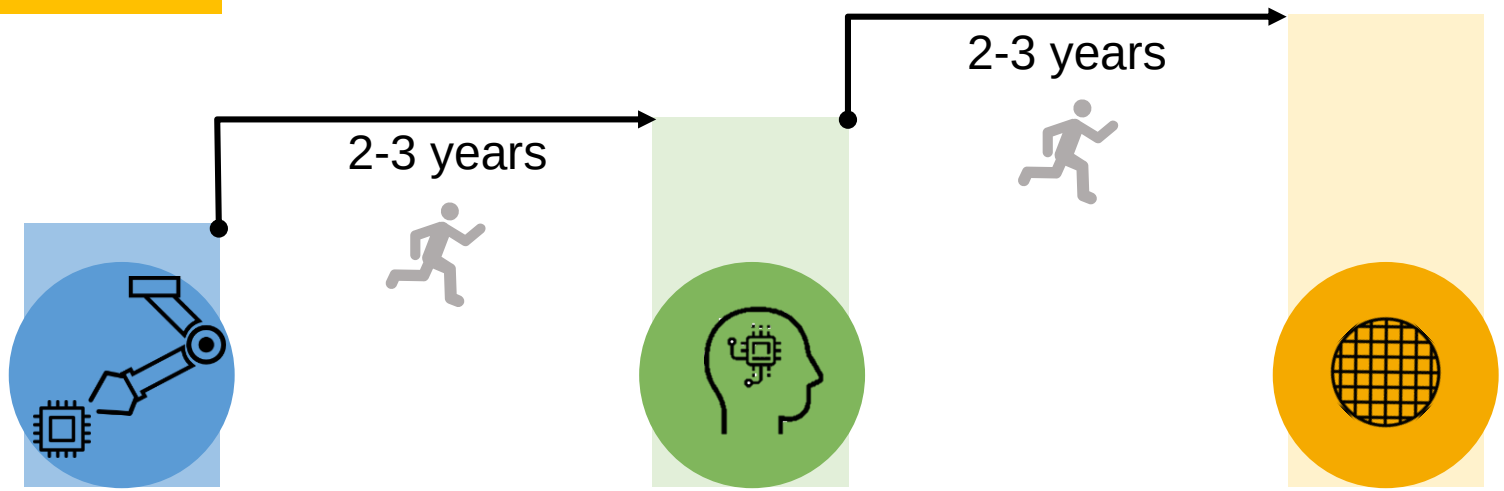
Business Model

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



License Fee

Foundries Process Development

Design License Fee

Fabless Product Development

Royalty

Wafer Mass Production

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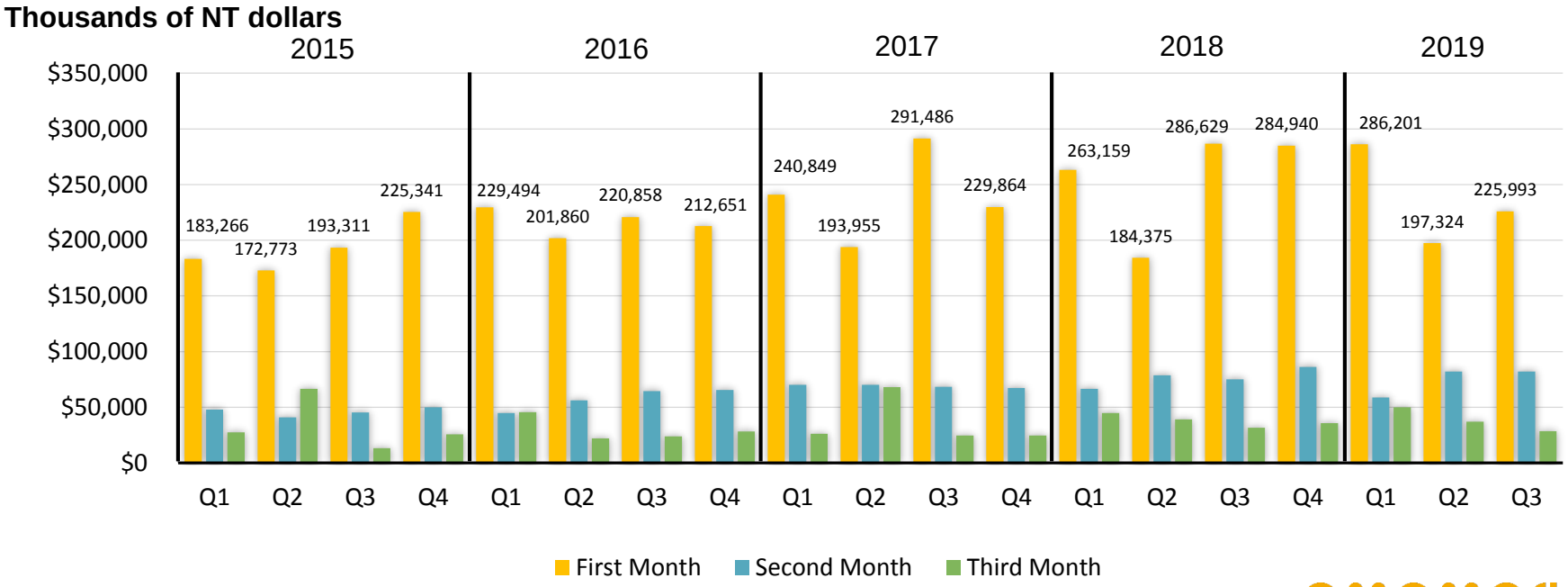
Quarterly Revenue Pattern

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

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



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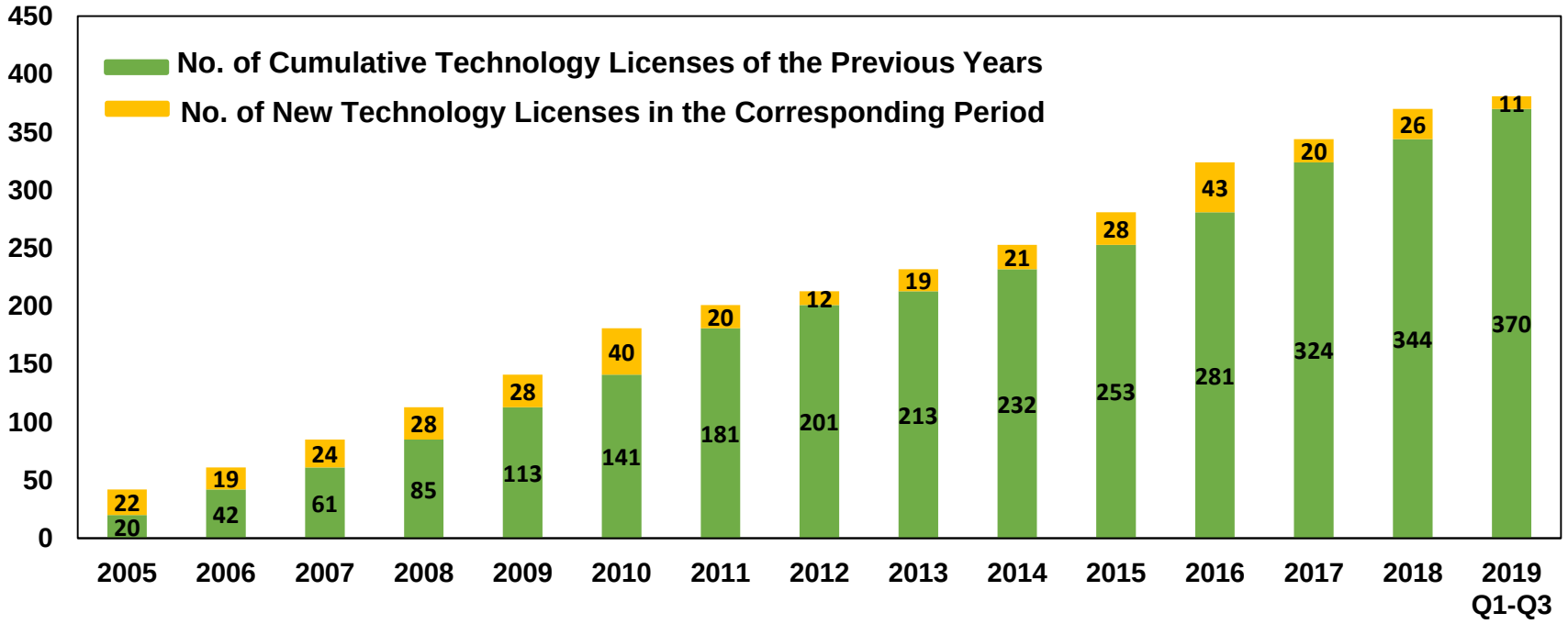
Technology Licenses

Cumulative technology licenses

Number of Licenses

Year	2016	2017	2018	2019 Q1-Q3
License	43	20	26	11

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.



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New Technology under Development

Products in different process nodes

- New technologies being developed for 100 platforms by Q3 2019.
- 4 licensing contracts were signed, 2 for NeoBit and 2 for NeoFuse.

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

Note: As of Sept 30th, 2019

Technology Development

Developments by process node

12" Fabs	Production	Development	IP Type	Process Type
5/6nm	0	1		
7/10nm	1	2	OTP, PUF	FF, FF+
12/16nm	3	3	OTP	FF, FF+
28nm	18	16	OTP, PUF	LP/ULP/ULL, HPC/HPC+, HV-OLED, DRAM, SOI
40nm	11	7	OTP, PUF, MTP	LP/ULP, E-Flash, HV-DDI/OLED
55/65nm	20	14	OTP, PUF, MTP	LP/ULP, E-Flash, HV-DDI/OLED, DRAM, CIS, BCD, PM
80/90nm	13	10	OTP, MTP	HV-DDI/OLED, LP, Generic, BCD
0.13/0.11um	13	7	OTP, MTP	HV-DDI, BCD, Generic
0.18um	1	0	OTP	BCD, Generic
Total	80	60		

8" Fabs	Development	IP Type	Process Type
90nm	3	OTP	HV-DDI, LL, BCD
0.13/0.11um	14	OTP, MTP, PUF	HV/HV-MR, BCD, LP/LL, CIS, Green, Flash, SOI, Generic
0.18/0.16/0.152um	21	OTP, MTP	HV/HV-MR, BCD, LP/LL, CIS, Green, Generic
0.25um	2	OTP	BCD
0.35um	0	OTP	UHV
Total	40		

Note: As of Sept 30th, 2019

PUF-based Hardware Security IP

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

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.

PUFflash

Secure Embedded Flash

NeoPUF enables secure masking and address scrambling for flash memory.

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.

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