eMemory Q2 2021 Results – Earnings Call Q&A

August 11th, 2021

Applications/Process nodes/Customers/Foundries/Revenue

1. **Would you explain why your July royalties only grew 5%?**

   Our royalties grew 12% in terms of US dollars. Royalty from the majority of our foundry partners grew 20% or above, except for a significant drop from a Chinese foundry due to the ceasing of production by a Chinese customer. We expect royalties from that Chinese foundry to pick up when other customers ramp up production. Our August royalties will grow much higher, with a correlating rise in the total Q3 growth.

2. **Are there any limitations for your IPs as you move forward into the newest technology platforms? Can it work for say 2nm GAA?**

   There is no limitation and we are confident it will work for the GAA structure. Since the transistor is always a MOS (metal-oxide-semiconductor) structure, which is the basis for our OTP technology, our processes remain robust and able to scale.

3. **Global Semiconductor foundries are expanding their capital expenditure, especially for the 28nm process. How will this impact the company?**

   As mentioned previously, we have accumulated more than 140 NTOs at the 28/22nm process node, with our IPs widely used in various products. Currently, major foundries are actively expanding the 28nm production capacity. This will help us during wafer production volume in the future. In addition, the ASP of 28nm wafer is several times higher than the ASP of wafers on mature processes. As our royalty rate is fixed, this will also benefit us in terms of royalty income.

4. **TSMC has announced 28nm production expansion. How will these 28nm products affect eMemory's royalties in 2-3 years?**

So far, we have accumulated more than 60 NTOs at TSMC's 28/22nm nodes, across several different application fields. We are confident that new NTOs will continue to come in bringing a significant rise in royalty income for us in the next 2-3 years.

5. **TSMC has been emphasizing that HPC drives semiconductor demand in their past earnings call. What contribution does this have to the company?**
   The application of HPC is mainly concentrated in advanced processes. We have made good progress in advanced processes, and have received some customer requests in applications such as FPGA, AI, and DPU. The licensing per case and royalty per wafer are much higher than mature processes, which is also a considerable driver to our future revenue contribution.

6. **The mature process wafer fabs have an expanding annual revenue growth rate trend, and wafer prices are also accelerating. However, the company's annual revenue growth rate does not reflect it. What is the reason?**
   Our royalties in the first half of the year were 35.4% YoY growth (in terms of US dollars). Our largest foundry customer did not increase wafer prices in line with the other foundries. This caused only a slight rise to our wafer price ASP overall.

7. **If Intel wants to enter the foundry industry, it can open its IPs for customers to use, or it could accept the IPs that most foundries are already using. Which kind of development does the company think is more likely to happen, and how is its impact on the company?**
   Foundries and IDMs are customers that we value very much. The largest foundries in the world have proven that our products can help their customers bring good production experience and records. In addition, our IPs offer the best convenience for end customers to freely move from different foundries compared to use foundry internal solution. So, our IPs can bring great benefits to any fab that intends to get

into the foundry business, especially since many of the major fabless customers they value are our existing customers.

8. **In the previous earnings call, the company mentioned that if customers use NeoPUF, they will also use NeoFuse. Will the licensing fee and royalties be charged double? Is the price of NeoPUF higher than NeoFuse?**

   As we mentioned in our previous earnings call, our NeoFuse provides a secure storage function and NeoPUF provides secure key generation. Both are essential for security applications. We can provide integrated IPs that have a comprehensive solution with a “one stop shop”. Such integrated IPs will have a higher upfront fee and royalty than the single one.

9. **When does NeoBit's patent expire?**

   Generally, a patent grant period is 20-years. However, when we license our technology to foundry/IDM, it is not just a single patent. It is actually a patent group that includes bit-cell structure, operation scheme, array architecture, design circuit, and relevant process patents and know-how. Besides, we will continue to add new patents and features to make our licensed technology more powerful and useful. That is the reason we can keep providing the best solutions to our foundry partners and customers. For example, our NeoBit cell patent was applied again in 2014 due to continuous improvement of cell structure and design to extend the expiration date to 2034. Similar will be applied to our other technologies. So, we are not worried about the due date of a single patent.

10. **Will eMemory also collects royalties for the mass production of PUFsecurity’s products?**

    From our business model, we collect royalty from foundries according to our OTP/PUF technology license grant to them. Additional design royalty will be collected from fabless customers per their security IP requirement from

PUFsecurity. That is the business model we are running now.

11. **Did the royalty growth in the first half of the year mainly come from Samsung's production in UMC? Is it using NeoFuse and how long will this continue?**

    We have received a clear growth in our royalties from various foundries in the first half and UMC is one of them. With more accumulated NTOs in 12" processes till now, we would expect such momentum to keep moving.

12. **Will there be customer wafer production next year for NeoPUF? Who are the customers and which are the processes?**

    We already have some customer NTOs with our NeoPUF IPs from 0.11um to 7nm process nodes. Some of them are in the engineering sample delivery stage and will start to have some wafer volume production in the second half.

13. **TSMC will set up fabs in different countries, which will involve a large amount of investment and inevitably affect gross profit. Will there be any discount requirements for IP providers?**

    Foundries are expanding their capacity in different locations due to geopolitical considerations. Our NVM IPs are within their ecosystem and will be brought to different fabs as well. We already have a fixed business model and contracts with foundries. So, everything will run as usual and we will do our best to support their capacity expansion plans.

14. **When are N7 and N5 expected to start contributing royalties?**

    We would expect to collect N7 royalty from a FPGA customer later this year in October. As to N5, our OTP is still in the qualification stage and will take additional 1-2 years to start collecting the production royalty.

15. **Are there any new customers added from DRAM?**

    We are qualifying OTP in the new DRAM process for PSMC and already have alpha customers under design-in.

16. **What is the progress status and potential development applications for MRAM and ReRAM?**

    For MRAM, we are developing in 22nm ULP process with partners. As for ReRAM, we just completed the qualification in 40nm process node and are developing the 22nm now. For these emerging memories, they can be used as NVM for Analog ICs (like SOC PMIC), MCU, SoC, ASIC, and Edge AI. They also can be used as Cache memory for CPU and Mobile.

17. **WiFi 6 has evolved into WiFi 6E and even to WiFi 7. What changes does this have for the use of NeoFuse?**

    WiFi 6 and WiFi 7 will use the same security architecture, therefore NeoFuse can be used in the same way to store the private key. NeoFuse is replacing eFuse for key storage for higher security request.

18. **In the future, what applications will expand to a considerable proportion of revenue like DDIC, PMIC, and Fingerprint? What is the progress with ARM and what are the processes?**

    Our royalty is based on wafer volume. Any kind of applications with large wafer volume, will be our target. Applications like CIS, ISP, and DRAM, will have a good wafer volume. Besides, advanced nodes have a higher wafer ASP, with good wafer volume. We use security IP to increase our penetration rate. As with the cooperation ARM, currently it is on the 40nm and 22nm for IoT, and Edge AI applications. We are also moving to more advanced technology like 7nm and below. We expect to have more cooperation in the future.

Security/PUF

19. When can we see more meaningful contributions from PUF security IPs?

The business model we prefer is a royalty stream business model. To maximize the future continuous royalty stream, we are building the platform business model for PUFsecurity. We are building platforms in foundries, CPU IP, and design services. As all of these platforms start to roll out, we will see a meaningful return from PUFsecurity. In addition to these platforms, we already have quite a few customers using PUF-based security solutions. They will start to have products by the end of this year or early next year. Our branding on security has grown quite a bit which we have observed from the inquiry through our promotion program.

20. The company hopes that in the future PUF will be used in every chip. Why will every chip need a PUF solution?

There are quite a few companies who provide CPU have invited us to cooperate with them using our PUF-based security solutions with their CPU. It is our goal that, in the future, all chips need PUF-based security solution as security requirement becomes higher.

21. PUFsecurity is the first to propose a product, PUFiot that meets the FIDO standard. Using PUF as device identification can help IoT device development and manufacturers (OEM/ODM) to create IoT product solutions that meet the FIDO standard. Does this mean that eMemory's secure IP will become a security standard for IoT?

Yes, FIDO device on board has defined the IoT device authentication standard for connecting online. Our PUFiot’s security function satisfies the defined on board standard.

22. First-tier companies such as Microsoft are promoting no password verification. What is the impact on eMemory's OTP and PUF?

This is related to FIDO standard as they also promote no password verification. Microsoft promotes the no password verification requires an authentication process that requires a unique ID. PUF can generate a unique ID easily which is essential for a system without password verification.

23. How is NeoPUF used in a DPU? Is it used for public key encryption? Do cloud and end devices have to use eMemory's NeoPUF technology for effective decryption?

DPUs are used in the system is to share the load of the CPU. A DPU can take care of security functions as well as storage processing. NeoPUF is used to protect the private key, which is an essential element for chip security. Edge and cloud devices can decode the secret by the shared key.

24. What is the difference in cost and performance between NeoPUF's IP and a single dedicated security chip, such as T2?

T2, which is used in Apple, is a standalone secure element chip. NeoPUF-based secure element IP can be embedded into the AP, which improves security and save cost.

25. eMemory’s major revenue is from Asia/China. Most US big IC fabless like Google, Apple, and QCOM use US-based similar vendors. How does eMemory plans to grow your business in the US, or the larger market?

Among the vendors in the list, two of them are already our customers. We plan to promote our PUF-based security solutions as many customers are concerned with security issues. From many press releases or newsletters, particularly platform companies are concerned about security issues. This is because hackers can hack their platforms, cloud, or servers through the edge devices, which makes them unsecure. This is what we have done and are doing to promote our business to the big customers