

# China Technology

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## Implications of US's new chip export restrictions to China

US Department of Commerce announced new set of export controls on 7 Oct ([link](#)) that semiconductors made with US technology for use in advanced computing chips, supercomputers, and advanced semiconductors can only be sold to China with an export licence. This first rule targets to 1) tighten existing restrictions on logic IC of 16nm/14nm or below (i.e. FinFET or GAAFET), 2) extends restrictions to memory IC category (DRAM of 18nm or below, and NAND with 128-layer or more), and 3) foreign-owned production facilities located in China will need to apply for approval for related equipment on a case-by-case basis. The second rule added China's memory chipmaker Yangtze Memory and 30 other Chinese entities to "Unverified list". In our view, US's recent export controls and US Chips Act will accelerate localization of semi equipment/foundries in China given supply chain safety and geopolitical tensions. Despite recent macro weakness and inventory correction, we believe semi localization remains the structural growth driver in the long run.

- Impact on Chinese foundry industry:** Since SMIC was included on Entity List in 2020, we believe most Chinese foundries focus on expansion on 28nm and above processes. Given ongoing export restrictions by the US, Chinese foundries are actively partnering with Chinese, European and Japanese equipment manufacturers to build non-US production lines for 28nm and above processes. For Chinese foundries, we believe US's new export controls on logic IC (16nm/14nm and below) will boost localization of Chinese semi equipment and increase demand for domestic foundries of 28nm or above given foreign foundries' capex slowdown in China. In addition, for other foundries using US technology/equipment, e.g. TSMC, they may not be able to produce related advanced chips (16nm/14nm or below) for Chinese fabless companies without license in the future.
- Impact on Chinese memory industry.** For DRAM, we believe the restriction on 18nm or below process will increase difficulties for Chinese DRAM leader, ChangXin Memory Technologies (CXMT), to purchase equipment to upgrade products from 19nm process to 17nm process in 2022. We believe CXMT's new plants, such as Phase 2 in Hefei, may face challenges in obtaining equipment in the future. For NAND Flash, we believe the restriction on 128-layers and above will impact Yangtze Memory (YMTC)'s upgrade plan of its NAND facilities and client base expansion to overseas customers. For overseas companies with plants in China, we think SK Hynix's DRAM plant in Wuxi and Samsung's NAND plant in Xi'an may also be impacted due to the new restriction.

### Valuation Table

Name	Ticker	Mkt Cap (US\$ mn)	Price (LC)	P/E (x)		P/B (x)		ROE
				FY22E	FY23E	FY22E	FY22E	
SMIC	981 HK	17,358	17.2	9.7	11.8	0.84	7.4	
Hua Hong Semi	1347 HK	3,009	18.08	8.4	9.0	0.93	12.1	

Source: Company data, CMBIGM estimates

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- China AI - U.S. may broaden AI chips export restrictions - 14 Sep 2022 ([link](#))
- Implications of SMIC/Hua Hong 2Q22 results and recent US semi restrictions – 15 Aug 2022 ([link](#))

**Figure 1: US BIS to tighten export control on advanced computing and semiconductor manufacturing items**



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**Commerce Implements New Export Controls on Advanced Computing and Semiconductor Manufacturing Items to the People's Republic of China (PRC)**

Washington, D.C.—The Department of Commerce's Bureau of Industry and Security (BIS) is implementing a series of targeted updates to its export controls as part of BIS's ongoing efforts to protect U.S. national security and foreign policy interests. These updates will restrict the People's Republic of China's (PRC's) ability to both purchase and manufacture certain high-end chips used in military applications and build on prior policies, company-specific actions, and less public regulatory, legal, and enforcement actions taken by BIS.

The export controls announced in the two rules today restrict the PRC's ability to obtain advanced computing chips, develop and maintain supercomputers, and manufacture advanced semiconductors. These items and capabilities are used by the PRC to produce advanced military systems including weapons of mass destruction; improve the speed and accuracy of its military decision making, planning, and logistics, as well as of its autonomous military systems; and commit human rights abuses. Finally, these rules make clear that foreign government actions that prevent BIS from making compliance determinations will impact a company's access to U.S. technology through addition to the Entity List.

"As I told Congress in July, my north star at BIS is to ensure that we are appropriately doing everything in our power to protect our national security and prevent sensitive technologies with military applications from being acquired by the People's Republic of China's military, intelligence, and security services," **said Under Secretary of Commerce for Industry and Security Alan Estevez**. "The threat environment is always changing, and we are updating our policies today to make sure we're addressing the challenges posed by the PRC while we continue our outreach and coordination with allies and partners."

"The PRC has poured resources into developing supercomputing capabilities and seeks to become a world leader in artificial intelligence by 2030. It is using these capabilities to monitor, track, and surveil their own citizens, and fuel its military modernization," **said Assistant Secretary of Commerce for Export Administration Thea D. Rozman Kendler**. "Our actions will protect U.S. national security and foreign policy interests while also sending a clear message that U.S. technological leadership is about values as well as innovation."

Source: US BIS ([bis.doc.gov](http://bis.doc.gov))

## New restriction's rule 1: Implementing Controls Related to Advanced Computing and Semiconductor Manufacturing:

BIS's rule on advanced computing and semiconductor manufacturing addresses U.S. national security and foreign policy concerns in two key areas. First, the rule imposes restrictive export controls on certain advanced computing semiconductor chips, transactions for supercomputer end-uses, and transactions involving certain entities on the Entity List. Second, the rule imposes new controls on certain semiconductor manufacturing items and on transactions for certain integrated circuit (IC) end uses.

Specifically, the rule:

- 1.) Adds **certain advanced and high-performance computing chips and computer commodities that contain such chips to the Commerce Control List (CCL)**;
- 2.) Adds new license requirements for items destined for a supercomputer or semiconductor development or production end use in the PRC;
- 3.) **Expands the scope of the Export Administration Regulations (EAR) over certain foreign-produced advanced computing items and foreign produced items for supercomputer end uses**;
- 4.) Expands the scope of foreign-produced items subject to license requirements to twenty-eight existing entities on the Entity List that are located in the PRC;
- 5.) Adds **certain semiconductor manufacturing equipment and related items to the CCL**;
- 6.) Adds **new license requirements for items destined to a semiconductor fabrication "facility" in the PRC that fabricates ICs meeting specified**. Licenses for facilities owned by PRC entities will face a "presumption of denial," and facilities owned by multinationals will be decided on a case-by-case basis. The relevant thresholds are as follows:
  - **Logic chips with non-planar transistor architectures (i.e., FinFET or GAAFET) of 16nm or 14nm, or below;**
  - **DRAM memory chips of 18nm half-pitch or less;**
  - **NAND flash memory chips with 128 layers or more.**
- 7.) **Restricts the ability of U.S. persons to support the development, or production, of ICs at certain PRC-located semiconductor fabrication "facilities" without a license**;
- 8.) Adds **new license requirements to export items to develop or produce semiconductor manufacturing equipment and related items**; and
- 9.) Establishes a Temporary General License (TGL) to minimize the short-term impact on the semiconductor supply chain by allowing specific, limited manufacturing activities related to items destined for use outside the PRC.

The rule is effective in phases after being filed for Public Inspection with the Federal Register. The semiconductor manufacturing items restrictions are effective upon filing for Public Inspection (October 7, 2022), the restrictions on U.S. persons' ability to support the development, production, or use of ICs at certain PRC-located semiconductor fabrication "facilities" is effective five days later (October 12, 2022), and the advanced computing and supercomputer controls, as well as the other changes in the rule, are effective 14 days later (October 21, 2022).

## New restriction's rule 2: Revisions to BIS's Unverified List:

BIS is also updating its regulations related to BIS's Entity List to clarify that a sustained lack of cooperation by the host government that effectively prevents BIS from determining compliance with the EAR may lead to the addition of an entity to the Entity List.

The rule provides an example that stipulates that sustained lack of cooperation by a foreign government that prevents BIS from verifying the bona fides of companies on the Unverified List (UVL) can result in those parties being moved to the Entity List, if an end-use check is not timely scheduled and completed. All additions, removals, or revisions to the Entity List are still subject to the approval of the End-User Review Committee, which is made up of the Departments of Commerce, State, Defense, and Energy pursuant to existing rules.

**The rule adds 31 new entities to the UVL and removes 9 entities that have met relevant requirements.**

Consistent with this regulatory change, Export Enforcement has issued a policy memorandum Addressing Foreign Government Prevention of End-Use Checks. The memo is available online [here](#). The policy calls for adding parties to the Unverified List 60 days after checks are requested but host government inaction prevents their completion, and an additional 60-day process for adding UVL parties to the Entity List when there is a sustained lack of cooperation by a host government to facilitate completion of the checks.

**Figure 2: 31 new entities to be added onto US BIS's Unverified List (UVL)**

English Name	Chinese Name
1 Beijing Naura Magnetolectric Technology	北方华创磁电科技有限公司
2 Beijing PowerMac Company	北京普科测控技术有限公司
3 CCIC Southern Electronic Product Testing Co., Ltd	中检集团南方电子产品测试股份有限公司
4 Chang Zhou Jin Tan Teng Yuan Machinerv Parts Co Ltd	常州市金坛腾远机械配件有限公司
5 Institute of Mineral Resources. Chinese Academy of Geological Science	中国地质科学院矿产资源研究所
6 Chinese Academy of Science (CAS) Institute of Chemistry	中国科学院化学研究所
7 Chongqing Optel Telecom	重庆奥普泰通信技术有限公司
8 Chongqing Xinyuhang Technology Co., Ltd.	重庆新城科技有限公司
9 Dandong Nondestructive Electronic:	丹东无损检测
10 DK Laser Company Ltd	湖南大科激光有限公司
11 Foshan Huaguo Optical Co. Ltd	佛山華國光學器材有限公司
12 GRG Metrology & Test (Chongqing) Co., Ltd.	广电计量检测(重庆)有限公司
13 Guangdong Dongling Carbon Tech. Co. Ltd	广东东麟碳素科技有限公司
14 Guangxi Yuchai Machinery Co. Ltd.	广西玉柴金兴机械有限公司
15 Guangzhou GRG Metrology & Test (Beijing) Co., Ltd.	广电计量检测 (北京)有限公司
16 Jain Precision Optics (Shanghai) Co., Ltd	嘉麟精密光学 (上海) 有限公司
17 Lishui Zhengyang Electric Power Construction	丽水正阳电力建设有限公司
18 Nanjing Gova Technology Co. Ltd	南京高华科技股份有限公司
19 Ningbo III Lasers Technology Co., Ltd.	恒普 (宁波) 激光科技有限公司
20 Qingdao Sci-Tech Innovation Quality Testing Co., Ltd.	青岛科创质量检测有限公司
21 Shanghai Tech University	上海科技大学
22 Suzhou Sen-Chuan Machinery Technology Co., Ltd.	苏州森川机械科技有限公司
23 Lianjin Optical Valley Technology Co., Ltd	天津光谷激光技术有限公司
24 University of Chinese Academy of Sciences	中国科学院大学
25 University of Shanghai for Science and Technology	上海理工大学
26 Vital Advanced Materials Co. Ltd.	广东先导先进材料股份有限公司
27 Wuhan Institute of Biological Products Co., Ltd.	武汉生物制品研究所有限责任公司
28 Wuhan Juhere Photonic Tech Co. Ltd.	武汉聚合光子技术有限公司
29 Wuxi Hengling Technology Co., Ltd.	无锡恒领科技有限公司
30 Xian Zhongsheng Shengyuan Technology Co., Ltd	西安中盛圣远科技有限公司
31 Yangtze Memory Technologies Co., Ltd.	长江存储科技有限责任公司

Source: US BIS, CMBIGM

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