# Technology Transfers in response to US Export Controls --- a Discussion from US Restrictions on Selling EDA to China

By Xun Yang | Ying Zhang

The US government has been increasing its controls over exports of technology to China. In response, many Chinese companies are preparing for plan B in case one day the supply of key technology or software ceases. This results in many technology transfer transactions, in which mechanism to overcome US export control is a key issue to be designed.

## Background

Synopsys announced on May 29, 2025 that it is suspending its financial guidance due to new U.S. export restrictions on Electronic Design Automation (EDA) software sales to China. The company confirmed receiving a letter from the Bureau of Industry and Security (BIS) informing it of the new restrictions. The company stated, "Synopsys is currently assessing the potential impact of the BIS letter on its business, operating results, and financial condition." As a result, Synopsys has decided to shut down its operations in China, citing compliance with the newly issued regulations.

The BIS letter was issued on May 23, 2025, and was sent to other major EDA suppliers, such as Cadence Design Systems and Siemens EDA, outlines new export controls aimed at limiting China's access to advanced semiconductor design tools. According to reports, the BIS determined that EDA software posed "an unacceptable risk of use in or diversion to a 'military end use' in China or for a Chinese 'military end user'". The new restrictions require U.S. companies to obtain specific export licenses before selling EDA software to Chinese customers. Cadence confirmed receiving a notice stating that a license is now required for "the export, re-export, or in-country transfer of electronic design automation software" to customers in China.

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## BIS and Enforcement of Export Control Rules

BIS enforces export controls under the Export Administration Regulations (EAR), which derive authority from the Export Control Reform Act (ECRA) of 2018. The recent restrictions on EDA software sales to China are based on Section 744.21 of the EAR, which limits exports to military end users and end uses in China. A military end user includes national armed services, government intelligence organizations, and entities supporting military development, while military end use encompasses the development, production, maintenance, or operation of military items. BIS exercises discretion in expanding the scope of restrictions by assessing whether a technology—such as EDA software—could enhance China's military capabilities through advanced semiconductor design or AI-driven defense technologies. Additionally, Supplement No. 4 to Part 744 imposes further licensing requirements on Chinese entities affiliated with military applications, ensuring restricted items do not fall into China's military-industrial complex. Section 734.3 of the EAR extends export controls to U.S.-origin technology, ensuring even foreign-made products incorporating U.S. software remain subject to restrictions.

The enforcement of these export restrictions follows a licensing-based approach, requiring U.S. companies like Synopsys, Cadence, and Siemens EDA to obtain specific export licenses before selling EDA software to China. BIS mandates end-user verification to ensure restricted entities do not gain access, particularly those listed in Supplement No. 4 to Part 744, which includes Chinese semiconductor firms, defense contractors, and universities conducting military-related research. These entities are subject to additional export licensing requirements, meaning U.S. exporters must undergo intensified scrutiny before conducting business with them. Violations of these export regulations result in severe penalties, including financial fines, criminal prosecution, and additional trade bans. The U.S. government monitors compliance through audits and investigations, ensuring exporters adhere to the imposed controls. By enforcing these mechanisms, BIS seeks to curb China's ability to develop advanced semiconductors, AI chips, and military technology.

The consequences of these restrictions are far-reaching. Chinese semiconductor firms face significant hurdles in chip design, slowing progress in high-performance computing and AI development. U.S. companies, particularly Synopsys and Cadence, risk losing major revenue streams due to reduced access to the Chinese market. In response, China is likely to accelerate efforts to build domestic EDA alternatives, with companies like Huawei and X-Epic already working on independent solutions. The restrictions on entities listed in Supplement No. 4 to Part 744 ensure that military-linked institutions are unable to procure U.S. technology, forcing China to invest billions in localized research and development. These restrictions further escalate U.S.-China trade tensions, disrupting the global semiconductor supply chain and reshaping technological alliances worldwide.

## China Reactions from Policy Level

Realizing that over reliance on western supplied software threats national security, China has long pursued technological self-sufficiency, aiming to reduce reliance on foreign technology and strengthen its domestic innovation capabilities.

With respect to software supplies, China has been actively promoting software independence by encouraging the adoption of open-source software in government functions and financial institutions. Since 2019, Chinese authorities have mandated the replacement of foreign computer equipment and software in government offices with domestic alternatives, leading to the launch of OpenKylin in July 2023. In the banking sector, the banking regulator also calls for gradually reduction in using foreign software of which the source codes are not available in China. Consequently, domestic vendors like Sunline have developed cloud-native banking platforms, replacing traditional COBOL-based systems.

The effort to pursue self-sufficiency has been central to policies like "Made in China 2025", which focuses on developing self-controlled technology, advancing key industries such as semiconductors, artificial intelligence, and high-performance computing. These initiatives reflect China's increasing concern over secured technology supply and its strategic response to the U.S. export controls, ensuring that domestic firms can develop independent alternatives to restricted technologies.

In addition to promoting indigenous innovation, China has strengthened its legal framework to counter foreign sanctions. The Anti-Foreign Sanctions Law (AFSL), enacted in June 2021, provides a legal basis for imposing countermeasures against foreign entities that enforce discriminatory restrictions on Chinese firms. Article 6 of the AFSL states that relevant departments under the State Council may take measures such as "refusal to issue visas, denial of entry, cancellation of visas, or deportation; sealing, seizure, or freezing of movable property, immovable property and other types of property within the territory of China; prohibition or restriction of organizations or individuals within the territory of China from engaging in relevant transactions, cooperation or other activities with them". In March 2025, China's Supreme People's Court (SPC) included the first tort lawsuit [Case No. (2024) Su 72 Min Chu 2157] under the AFSL in its work report. In this case, a Chinese marine engineering company filed a lawsuit with Nanjing Maritime Court under Article 12 of the AFSL after a European partner withheld USD 11.86 million in final payment due to third-country sanctions, ultimately recovering over CNY 84 million in construction payments through mediation. The AFSL enables China to seize assets, restrict transactions, and impose penalties on entities that comply with foreign sanctions, reinforcing its ability to protect domestic businesses from external trade restrictions.

## Reactions from China Companies

Chinese companies have increasing concerns over possible U.S. export controls, as restrictions on high-tech goods and software have increasingly disrupted their ability to access critical technology. The U.S. has imposed severe limitations on semiconductor equipment, AI chips, and EDA software, forcing Chinese firms to seek alternative solutions to maintain their technological development.

One key approach has been technology transfers, where Chinese companies acquire or license foreign technology to ensure continuity in design, manufacturing, and software development. However, successful implementation of such transfers requires careful planning, as the risks associated with abrupt policy changes and enforcement actions remain significant.

A major challenge in technology transfers is the possibility of the U.S. government ordering an immediate cessation of ongoing agreements. US has previously halted exports and collaborations involving sensitive technologies, leaving Chinese companies unable to complete development or integrate transferred systems. To counteract these risks, China's AFSL provides a legal framework allowing affected companies to seek compensation and legal remedies if foreign entities terminate contracts due to compliance with U.S. sanctions. While the AFSL can reinstate contractual rights, Chinese firms must still overcome practical obstacles, such as the loss of technical support, access to source codes, or regular software updates, which may hinder the actual implementation of transferred technology.

To address these practical difficulties, Chinese companies may adopt three key approaches.

First, they emphasize timing in technology transfers, ensuring that critical technology is acquired before restrictions take effect. Waiting until a U.S. ban is issued is too late, as American firms and individuals would then be prohibited from completing the transfer.

Second, in cases of long-term development collaborations, Chinese firms establish safeguards such as daily information sharing, training programs, and cross-licensing agreements for foreground intellectual property. This mitigates risks by ensuring that Chinese partners can retain knowledge and continue development even if U.S. firms are forced to withdraw.

Third, when transferring software, Chinese companies secure a local copy of source codes within the territory of China to retain access in case U.S. firms are ordered to cease technical support. Maintaining independent software repositories allows Chinese developers to continue troubleshooting, maintenance, and future upgrades without relying on foreign expertise.

**If you would like to know more information about the subjects covered in this publication, please contact:**

**Xun Yang**
+86 21 3135 8799
xun.yang@llinkslaw.com

**SHANGHAI**
19F, ONE LUJIAZUI
68 Yin Cheng Road Middle
Shanghai 200120 P.R.China
T: +86 21 3135 8666
F: +86 21 3135 8600

**BEIJING**
30F, Central Tower, China Overseas Plaza, 8 Guanghuadongli,
Chaoyang District
Beijing 100020 P.R.China
T: +86 10 5081 3888
F: +86 10 5081 3866

**SHENZHEN**
18F, China Resources Tower
2666 Keyuan South Road,
Nanshan District
Shenzhen 518063 P.R.China
T: +86 755 3391 7666
F: +86 755 3391 7668

**HONG KONG**
Room 3201, 32/F, Alexandra House
18 Chater Road
Central, Hong Kong
T: +852 2592 1978
F: +852 2868 0883

**LONDON**
1/F, 3 More London Riverside
London SE1 2RE
United Kingdom
T: +44 (0)20 3283 4337
D: +44 (0)20 3283 4323

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