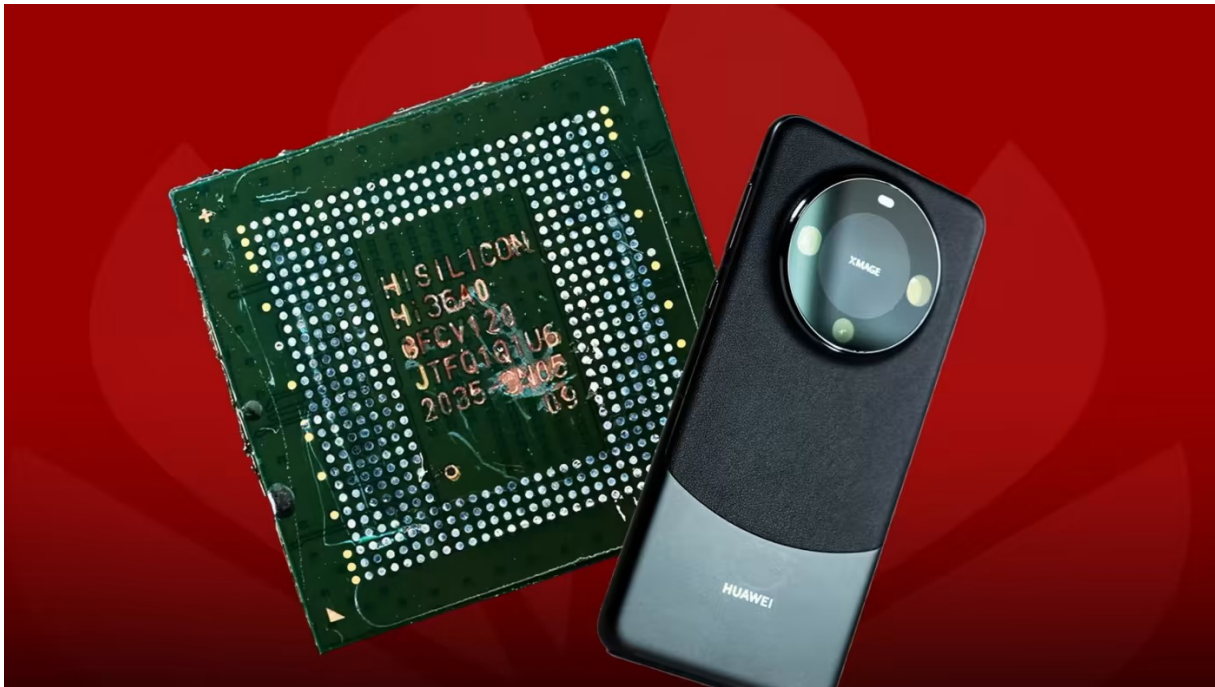


Huawei Technologies

Huawei makes processor breakthrough in flagship smartphone

Facing US sanctions, Chinese company emulates Apple by using its own designs in chips for Mate 60 Pro



Half of the central processing units in the system on a chip of Huawei's new Mate 60 Pro smartphone feature the company's own designs and adaptations © FT montage/Bloomberg

Qianer Liu in Hong Kong 8 HOURS AGO

Huawei is emulating Apple in developing the processors that power its latest smartphone, a breakthrough that will help the Chinese company to reduce its reliance on foreign technology as it confronts US sanctions.

Analysis of the main chip inside the Mate 60 Pro smartphone, which launched at the end of last month and immediately sold out, reveals that Huawei has joined the elite group of Big Tech companies capable of designing their own semiconductors.

Four of the eight central processing units in the Mate 60 Pro's "system on a chip" (SoC) rely purely on a design by Arm, the British company whose chip architecture powers 99 per cent of smartphones.

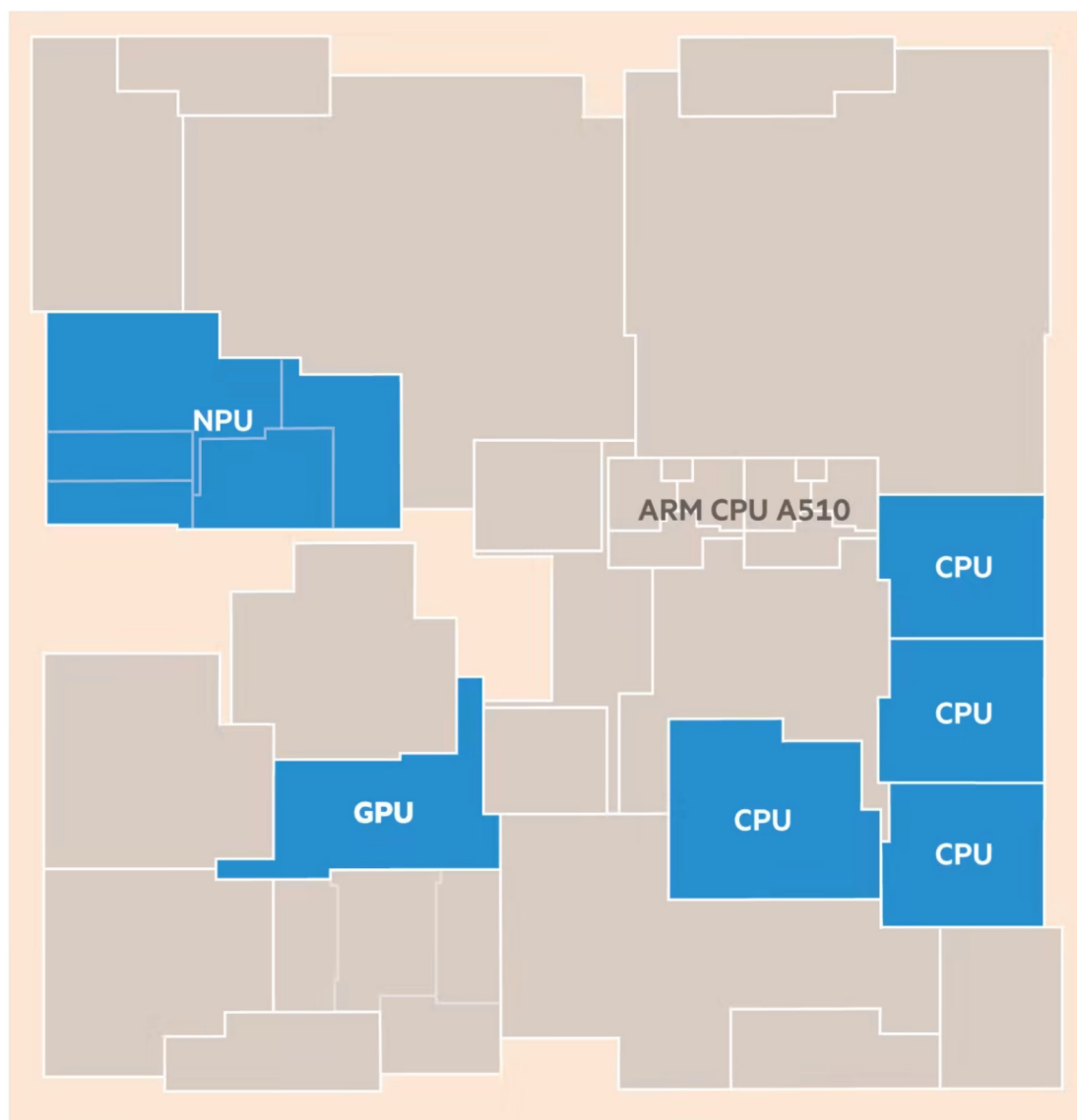
The other four CPUs are Arm-based but feature Huawei's own designs and adaptations, according to three people familiar with the Mate's development and Geekerwan, a Chinese technology testing company that took a closer look at the main chip.

[Huawei](#) has been struggling since 2019 under sanctions aimed at cutting off its access to advanced chips, equipment and software from the US for making 5G smartphones, forcing it to pivot to selling 4G gadgets and focus on its home market.

While Huawei is still licensing Arm's basic designs, its own HiSilicon chip design business has improved on them to build its own processor cores on the Mate's Kirin 9000S SoC. This will give it the flexibility needed to produce high-end smartphones despite the constraints of US export controls, said analysts and industry insiders.

Inside Huawei's Kirin 9000S Die

■ Indicates processors designed in-house by Huawei



Source: Geekerwan

© FT

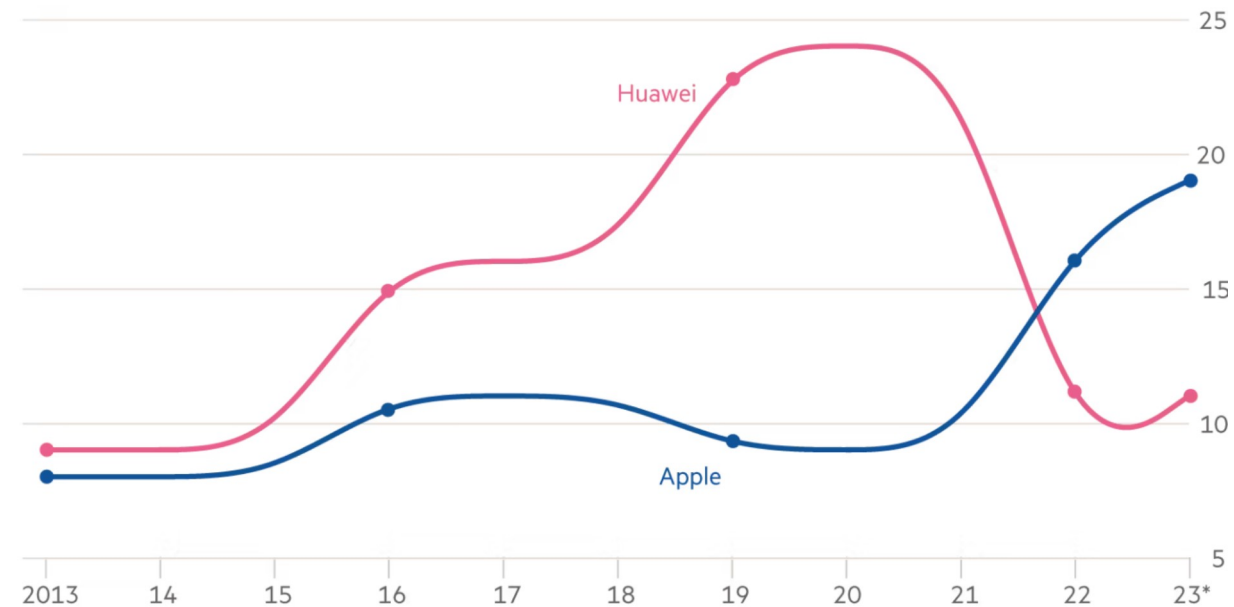
The Kirin 9000S also features a graphics processing unit and neural processing unit developed by HiSilicon. Its predecessor, the Kirin 9000 SoC, had relied completely on Arm for its CPUs and GPU.

The developments show that Huawei is pursuing a strategy similar to [Apple's Silicon initiative](#). Over more than a decade, Apple has improved upon Arm's basic architecture to give its iPhones and Macs a competitive edge in performance.

The complexity, huge costs and scarce engineering resources involved in semiconductor development mean only a few companies are able to take such an approach.

Apple vs Huawei's market share of smartphone sales in China

Per cent



* Forecast

Source: Counterpoint Research

© FT

Huawei may have made a breakthrough that allows it to “have indigenous design and not rely on foreign nations too much”, said Dylan Patel, chief analyst at consulting firm SemiAnalysis.

Other benefits to Huawei include reduced patent licensing costs and the opportunity to differentiate its products from rivals’ that use off-the-shelf chips, said analyst Brady Wang of Counterpoint Research.

Huawei was able to produce its own phone processors by adapting CPU core designs that were originally used in its data centre servers, according to people with direct knowledge of its development. The strategy resembles Apple’s moves to turn its iPhone processors into chips capable of powering its Mac computers — but in reverse.

“No one ever did this before,” Wang said of Huawei’s server-to-phone innovation.

“Huawei called on as many different internal resources as possible to achieve results in order to reduce its dependence on imported technology,” said a semiconductor analyst who did not want to be named because of the sensitivity of the situation.

However, the company still faces the challenge of producing cutting-edge chips with the latest equipment because the US restricts Huawei's suppliers. The Biden administration said earlier this month it was [seeking details](#) on the SoC inside Huawei's new phone.

Research group TechInsights earlier this month reported that the Mate 60 Pro's main chip had been made by China's Semiconductor Manufacturing International at the 7-nanometre node of miniaturisation — two generations behind the most advanced smartphone chipmaking production lines.

Huawei did not respond to a request for comment. Arm declined to comment.

The Mate 60 Pro has been touted as proving Huawei's ability to innovate to get around US sanctions, though analysts say the phone's performance shows how its progress has been hampered by export controls.

Various testing teams, including Geekerwan's, have found that Huawei's semiconductor capabilities are one to two years behind those of chips made by the US's Qualcomm, the leading mobile chipmaker. Huawei's chips also consume more power than its competitors', according to measurements, and can cause the phone to heat up.

“[We] could tell from the teardown that Huawei managed to replace most risky elements that were subject or vulnerable to export controls with homegrown or even in-house products,” said a person familiar with the company's smartphone chip design. “The endeavours are worthy of applause but not enough to claim victory.”

[Copyright](#) The Financial Times Limited 2023. All rights reserved.
