

ZTE denial and the semiconductor supply chain

Mike Cooke tries (and fails) to understand the complexities of the impact of US trade and security policy on the new world order.

It is rather unsettling and unexpected to be writing this article. As a species, we are faced with (at least) two existential crises: fast nuclear war or slow degeneration of our lived environment as a result of uneven climate changes. The effects of the latter problem are mainly being felt as yet by our poorer fellow world inhabitants, helped on by agricultural failures and war.

Occasionally this magazine touches on the hopes of contributing to avoiding climate change through solar energy conversion or more efficient electronics. Less obvious, perhaps, is the impact of semiconductor electronics on the politics of averting nuclear conflict.

Enter Zhongxing Telecommunications Equipment Corp (ZTE). This Chinese company has agreed to pay a penalty after allegedly "engaging in a multi-year conspiracy to violate the US trade embargo against Iran to obtain contracts to supply, build, operate and maintain telecommunications networks in Iran using US-origin equipment, and also illegally shipping telecommunications equipment to North Korea in violation of the Export Administration Regulations (15 C.F.R. Parts 730-774 (2017)) ('EAR', or the 'Regulations')" [US Department of Commerce, "ZTE Corporation and ZTE Kangxun Order Activating Denial Order", 15 April 2018].

This came before US President Donald Trump's announcement withdrawing from the 'Iran nuclear deal', officially known as the Joint Comprehensive Plan of Action (JCPOA). Meanwhile, the US President was gearing up for direct talks with North Korea's Supreme Leader Kim Jong-Un on 12 June in Singapore. Previously, on 15 May, North Korea had canceled talks with South Korea in response to joint military drills with the USA.

Access denied

The Denial Order on ZTE was initiated on 23 March, but some aspects were suspended subject to several probationary conditions. The activation of the suspended parts of the agreement follow a "pattern of deception, false statements and repeated violations of US law" by

ZTE, according to the US Commerce Department's Bureau of Industry and Security. The effect is that ZTE "may not, directly or indirectly, participate in any way in any transaction involving any commodity, software or technology... exported or to be exported from the United States that is subject to the Regulations, or in any other activity subject to the Regulations."

In an 'Inside Information Announcement' (9 May) to the Hong Kong stock exchanges, ZTE reported that, as a result of the Denial Order, major operation activities had ceased. Shenzhen Stock Exchange suspended trading in A shares from 17 April, at the application of ZTE. This was continuing as of 16 May.

Conversely, President Trump added this via Twitter: "ZTE, the large Chinese phone company, buys a big percentage of individual parts from US companies. This is also reflective of the larger trade deal we are negotiating with China and my personal relationship with President Xi." (14 May). This was in clarification of "President Xi of China, and I, are working together to give massive Chinese phone company, ZTE, a way to get back into business, fast. Too many jobs in China lost. Commerce Department has been instructed to get it done!" (13 May).

In the background of this may also be the pending merger/acquisition of NXP Semiconductors by Qualcomm, which is being held up by China's commerce ministry. It is also thought that about half of ZTE's phones contain Qualcomm CPUs. The withdrawal of access to wide-ranging US-based intellectual property and devices is surely a major part of the ZTE shutdown decision.

Commercial interlude

Who are the US suppliers that President Trump is worried about?

Qorvo reports that about \$10m of its quarterly revenue involves ZTE. The forecast for its Infrastructure & Defense Products (IDP) revenue is \$645-665m in the quarter to end-June (fiscal first-quarter 2019). The IDP division is the source of most of the ZTE sales, according to Qorvo.



ZTE's headquarters in Shenzhen, China.

The company produces chips based on both III-V — gallium arsenide (GaAs) and gallium nitride (GaN) — and silicon technologies.

NeoPhotonics is also worried, since it had estimated that up to 5% of its annualized revenue was to come from ZTE and its suppliers. Senior vice-president & chief financial officer Beth Eby also reported to an analyst briefing that the company was holding products in inventory for ZTE valued at approximately \$1.2m that has now been written down. The company's below-forecast performance was blamed mainly on this write-down. NeoPhotonics supplies photonic ICs and modules based on silicon photonics, hybrid photonic integration, indium phosphide, GaAs, silicon germanium, and indium gallium arsenide phosphide (InGaAsP) and indium gallium aluminium arsenide (InGaAlAs) lasers.

Lumentum commented in its 10-Q Security and Exchanges Commission filing (2 May): "Although we do not derive significant revenue from ZTE, there is increased attention from the government, the media and stockholders in this area and our stock price may be adversely affected as a result of this or further action. Further, we are aware that certain of our other customers have been investigated by the US government in the past and may be in the future. Any further sanctions or limitation on our ability to sell our products to certain customers could have an adverse effect on our business."

However, the company is also in the process of

acquiring fellow Silicon Valley-based firm Oclaro. Lumentum laments that "we face indirect reputational and business risks with respect to events that affect Oclaro's business during the pendency of the transaction and following the closing. For example, Oclaro has publicly disclosed that ZTE has been among its customers."

Lumentum produces photonics devices including edge-emitting and vertical-cavity surface-emitting laser diodes. Oclaro produces photonics products based on indium phosphide and lithium niobate.

Skyworks is another company that supplies ZTE and it expects the ban to hit its annual sales by \$25–30m. Second-quarter revenue was \$913m, and the next quarter (to June) is expected to be in the range \$875–900m. The company uses a range of silicon and III-V (GaAs and GaN) technologies for its RF components.

Push back

Getting back to the politics, tweets do not yet constitute legal documents of the US state, and they don't allow one to interpret and plan on the basis of a coherent policy position.

There was much push back on the US President's tweeted position (during the 'pro-China' phase) by US Commerce Secretary Wilbur Ross and from Republican US Senators such as Marco Rubio. Also, within a few days the tweets were more negative towards a general China trade deal and more particularly ZTE. ▶

On 17 May the US House of Representatives 'Appropriations Committee' unanimously approved an amendment to the Fiscal Year 2019 Commerce, Justice and Science Appropriations Bill before congress aimed at blocking any attempt at a ZTE bailout by Trump. The text from Democratic Representatives C.A. Dutch Ruppertsberger and Rosa DeLauro reads: "None of the funds made available by this Act may be used in contravention of the 'Order Activating Suspended Denial Order Relating to Zhongxing Telecommunications Equipment Corporation and ZTE Kangxun Telecommunications Ltd' (83 Fed. Reg. 17644) published on 23 April by the Bureau of Industry and Security."

A statement from Ruppertsberger's office adds that the congressman "has long suspected ZTE is used by the Chinese government to spy on Americans through the cell-phone components they manufacture."

In line with these security concerns, in early May the Defense Department (the Pentagon) ordered stores on military bases to stop selling ZTE and Huawei devices. Further, independent of the executive led by President Trump, the US Congress Defence Authorisation Bill (presently under construction) plans to ban government agencies from using ZTE technology, also on "national security" grounds.

Of course, given the close relationship between the Chinese state and Chinese companies, it is not difficult to believe that there could be backdoors and such in Chinese technology that could be accessed by China's Ministry of State Security for the purposes of state and industrial espionage. However, evidence of such activity is generally not offered, presumably due to the supposed need to protect national security sources and techniques.

Trade war

Also in the background is a looming and more generalized trade war between China and the USA. Trump's administration claimed (~17 May) that China had promised to buy more than \$200bn of US-made goods to avoid sanctions. In response, China's foreign ministry denied the claim. Talks are ongoing, but Trump himself is not hopeful.

Of course, ZTE is not the only Chinese technology company in the US Department of Commerce's sights. In fact, the leading Chinese smartphone producer Huawei could face a very similar ban to ZTE, and it has many of the same suppliers who could be hit much worse (for example, comprising 48% of NeoPhotonics' second-quarter revenue). On the other hand, Huawei owns more intellectual property and might be less liable to shutdown in the event of a US ban.

The ban(s) might be a blessing in disguise for Chinese technology development, making China's industry less dependent on external suppliers. The Chinese government has invested heavily in research in recent years, against the austerity trend in the West that has hit government and private R&D since the 1980s. A more self-sufficient Chinese supply chain would put up an increasing barrier to a very lucrative and expanding market for the rest of the world.

Other potential targets for bans on Chinese smartphone suppliers include OnePlus and Xiaomi.

Here's hoping this article is not obsolete by the time of publication.

The author Mike Cooke is a freelance technology journalist who has worked in the semiconductor and advanced technology sectors since 1997.

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