

**BACKGROUND MATERIAL FOR US-CHINA
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A. BACKGROUND

What is Optical Communications?

Optical networks have come to represent one of the core elements for our modern infrastructure. These networks provide the backbone for the information highway that connects people and systems together and transport the many trillions of bits of information that we use each day.

Optical networking equipment carries digital information using light waves over fiber optic networks. The advent of wavelength division multiplexing (“WDM”) systems has enabled the transmission of larger amounts of data by using multiple colors or wavelengths of light over a single optical fiber. Service Providers often use WDM systems to carry communications traffic between cities, referred to as long-haul networks, and within large metropolitan areas, referred to as metro networks. Optical networks are generally capable of carrying most types of communications traffic, from conventional long-distance telephone calls to e-mails and web sessions to high-definition video streaming. As service traffic grows, Service Providers add transmission capacity to existing optical networks or purchase and deploy additional systems to keep pace with capacity requirements and service expansion.

Who is Infinera?

Infinera is a US based company was founded in Sunnyvale California in 2001 with a vision of increasing the functionality and improving the economics of optical transport systems. Infinera has been a publicly-traded company since 2007 and employs approximately 1,200 people globally, most of them in Silicon Valley. Infinera also has facilities in Allentown, Pennsylvania Annapolis Junction, Maryland and overseas.

Infinera provides optical networking equipment, software and services to a variety of service providers, including regional and national services providers, internet content providers, cable operators and subsea network operators across the globe.

Infinera manufactures what we believe to be the world’s only commercially-deployed, large scale Photonic Integrated Circuits or “PICs”. Our current generation of PICs transmit and receive 100 billion bits per second of optical transmission capacity and incorporate the functionality of over 60 discrete optical functions into a pair of chips approximately the size of a fingernail. Our next generation PICs will transmit 500 Gigabits of optical transmission capacity and incorporate over 600 discrete optical functions into a pair of chips.

Similar to the way in which silicon integrated circuits changed the dynamics of the computing industry by increasing computing performance and reliability while reducing physical size, power consumption and heat dissipation, we believe that Infinera’s PICs have changed the dynamics of the optical network industry by increasing optical performance and reliability while reducing physical size, power consumption and heat

dissipation. We fabricate our PICs in California and develop the hardware and software that together comprises our optical network platforms that we sell to our customers.

B. WHO ARE HUAWEI AND ZTE; HOW ARE THEY SUPPORTED BY THE CHINESE GOVERNMENT

China has designated its telecommunications sector as a “strategic industry,” and it is expending significant resources to promote “national champions” in the industry both at home and abroad. The 12th Five-Year Plan approved by the Government of China in March of 2011 also identifies next generation information technology as one of seven “strategic and emerging industries” for priority government support.¹ The GOC aims for these seven industries to grow from their current output of 3 percent of GDP to 8 percent in 2015 and 15 percent in 2020, a plan that would require the industries to grow by 35 percent each year between now and 2015.² By 2030, China’s goal is to be a global leader in each of the seven industries.³

To reach this goal, China is reportedly aiming to invest \$1.5 trillion in the seven industries over the next five years.⁴ The Government aims to intensify government support for the industries through the establishment of special development funds, preferential tax policies, and the provision of increased credit support.⁵ While the Government aims to aggressively expand the dissemination of information technology within China as part of the 12th Five-Year Plan, allocating a reported RMB 2 trillion (over \$300 billion) in developing the country’s telecommunications infrastructure over the plan period,⁶ it is also focused on expanding the international presence of key firms in the sector. One of the key goals of the 12th Five-Year Plan is to support the “multinational operations” of enterprises in the seven strategic industries, to be achieved by “[i]mproving export credit, insurance, and related policies, [and] actively giving support to the exploration of international markets for key products, technologies, and services from the emerging industries of strategic importance together with outbound aid

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¹ People’s Republic of China, *Twelfth Five-Year Plan for National Economic and Social Development* (March 14, 2011), Chapter Ten.

² *Emerging Strategic Industries: Aggressive Growth Targets*, China Strategy, HSBC Global Research (October 19, 2010).

³ *Id.*

⁴ “More Loans for Key Industries,” china.org.cn (March 7, 2011).

⁵ People’s Republic of China, *Twelfth Five-Year Plan for National Economic and Social Development* (March 14, 2011), Chapter Ten. *See also Decision of the State Council on Accelerating the Fostering and Development of Emerging Industries of Strategic Importance* (October 10, 2010) at Section VII (I) – (III).

⁶ People’s Republic of China, *Twelfth Five-Year Plan for National Economic and Social Development* (March 14, 2011), Chapter Thirteen. *See also* “China Telecom to Build World’s Largest Fiber Optic Network,” People’s Daily Online (March 2, 2011).

⁷ *Decision of the State Council on Accelerating the Fostering and Development of Emerging Industries of Strategic Importance* (October 10, 2010) at Section VII (I) – (III).

This aggressive program over the twelfth five-year plan period builds on many years of government support for the telecommunications equipment industry. In 2008, the Government of China included telecommunications infrastructure improvements as one of three megaprojects that cumulatively received RMB 27 billion of the central government's stimulus funds in order to "accelerate" the projects' progress.⁸ In 2009, the State Council issued an Electronic Information Industry Restructuring and Revitalization Plan as part of its stimulus policies responding to the global recession.⁹ The plan aimed to nurture backbone enterprises in the industry and to "intensify fiscal, taxation, and financial supporting policies" for the industry.¹⁰ The policy also called for increased governmental support through state-owned bank financing and credits at "preferential rates" from the China Export-Import Bank.¹¹ The policy also called for increases in export tax rebates and more use of export credit insurance by the industry.¹²

China has also included many telecommunications products in its *2006 Catalogue of Chinese High-Tech Products*, its *2006 Catalogue of Chinese High-Tech Products for Export*, and its list of "encouraged" projects in the *2011 Directory Catalogue on Readjustment of Industrial Structure*. Inclusion on these lists comes with a number of benefits for firms that manufacture the items, including preferential tax rates, low-interest loans from state-owned banks, and subsidized export credit insurance. Examples of the telecommunications equipment listed in the catalogues include optical network routers, switches, concentrators, and base stations, wavelength division multiplexers, and other network equipment, including network equipment based on the TD-SCDMA standard.

China's top telecommunications equipment manufacturers, led by Huawei Technologies and ZTE Corporation, have grown exponentially as a result of this aggressive government support. As noted by the Commission in its 2011 report on the national security implications of the growth of these firms, Huawei has been designated as a national champion by the Government of China despite its insistence that it is a private firm that is independent of the state.¹³ The Government of China has protected and promoted these firms by requiring its state-owned telecom monopoly to discriminate in favor of domestic equipment suppliers and their domestic technology – as funds to expand domestic telecommunications infrastructure increases, so do the enormous advantages domestic equipment suppliers enjoy. With this solid foundation in the domestic market, the Government of China has targeted the firms with aggressive support to expand internationally, including through the provision of massive amounts of export

⁸ Micah Springut, et al., *China's Program for Science and Technology Modernization: Implications for American Competitiveness*, prepared by CENTRA Technology, Inc. for the U.S.-China Economic and Security Review Commission, 44 (January 2011).

⁹ State Council, *Electronic Information Industry Restructuring and Revitalization Plan* (April 15, 2009).

¹⁰ *Id.* at II.B.

¹¹ *Id.* at IV.D.

¹² *Id.* at IV.F.

¹³ *The National Security Implications of Investments and Products from the People's Republic of China in the Telecommunications Sector*, U.S.-China Economic and Security Review Commission Staff Report (Jan. 2011) at 11.

credits and export credit insurance. Finally, the firms enjoy a wide array of other government benefits, including preferential tax treatment, government grants, and other forms of support. The following three sections provide more details on these components of China's support for Huawei and ZTE.

1. China's Closed Telecommunications Equipment Market

The government is the owner, operator, and regulator of the telecommunications sector in China, and decisions regarding the procurement of telecommunications equipment are made accordingly. The three big telecommunications operators in China – China Mobile, China Telecom, and China Unicom – are all state-owned enterprises (“SOEs”). While SOEs would theoretically not be bound by the domestic preferences in China's government procurement law, there are reports that the big three are nonetheless encouraged or required to purchase domestic equipment where possible.

The U.S. Trade Representative reports that the Ministry of Industry and Information Technology (“MIIT”), which regulates the big three telecom operators, “reportedly has still not rescinded an internal circular issued in 1998 instructing telecommunications companies to buy components and equipment from domestic sources.”¹⁴ This is confirmed by independent industry sources. The Telecommunications Industry Association reports that, in some procurements by the big three, “companies are ignoring published criteria for bid evaluation, resulting in the selection of ‘national’ champions.”¹⁵ An investment advisory on China's telecom market states that MIIT “has encouraged Chinese operators to purchase telecommunications equipment from Chinese manufacturers, including leading suppliers such as Huawei, ZTE, Datang and Great Dragon.”¹⁶ A 2005 article notes that “Restrictive and confusing policies toward foreign manufacturers, in the form of foreign ownership and percentage of local components when bidding for major tenders, also ensured that local firms like Huawei and ZTE ... continued to dominate the local telecommunications equipment market.”

Inclusion of optical network equipment in the list of high-tech products eligible for designation as indigenous innovation products creates another mandate for telecom operators to give preference for domestic equipment, as China has aggressively pushed for a focus on indigenous innovation products in its policies to expand and upgrade its domestic telecommunications infrastructure. When China consolidated its telecommunications operators into the big three state-owned companies in 2008, it declared that one of the two central aspects of reform of the telecom sector is “adherence to indigenous innovation,” with goals that include realizing “scale application of indigenous innovation results, continuous development of follow-up technologies, [and]

¹⁴ U.S. Trade Representative, *2012 National Trade Estimate Report on Foreign Trade Barriers* (2012) at 69.

¹⁵ Telecommunications Industry Association Comments on the U.S. Trade Representative's 2011 Section 1377 report (Dec. 17, 2010) at 3.

¹⁶ The JIJ Group, “China Telecom Market: Opportunities for Foreign Investors.”

significant improvement of indigenous innovation capability.”¹⁷ In particular, the notice “encourages relevant departments, enterprises, and institutions to give priority to indigenously innovated products,” and “state-owned assets management departments shall use indigenous innovation as a key criterion in assessing telecom operators.”¹⁸ Finally, the notice directs financial institutions to increase support for indigenous innovation and directs relevant government departments to “use concessional loans, free aid, and other export policies to promote the international development of indigenously innovated products.”¹⁹ The Electronic Information Industry Restructuring and Revitalization Plan issued by the State Council in 2009 also seeks to enhance and accelerate indigenous innovation, calling for the “systemic application” of indigenously innovated products, and directing the industry to “strengthen the interaction between equipment manufacturing enterprises and telecommunication operators” and to “spur the development of the communications equipment industry through large-scale application.”²⁰

In 2009, the Government of China included MSTP optical transmission systems, SDH optical fiber transmission systems, and optical wavelength division multiplexers among the list of products eligible to apply for accreditation as indigenous innovation products.²¹ While the government has reportedly not developed a central-level catalogue of indigenous innovation products, optical network equipment is listed in indigenous innovation catalogues that have been developed by provincial and municipal level governments.²² The U.S. has attempted to address China’s use of indigenous standards to promote domestic technology through the Joint Commission on Commerce and Trade and the Strategic and Economic Dialogue processes. In late 2010, China committed that it would take an “open and transparent” approach to telecom operators’ selection of technology, and that it would not interfere in operators’ free choice of preferred technologies for new communications networks.²³ These commitments were reiterated by President Hu Jintao in a January 2011 visit to the White House.²⁴ Nevertheless, the 2008 and 2009 policies cited above appear to remain in effect.

The practice of state-owned telecom companies to give preference to domestic equipment suppliers is further evidenced by statements in the telecom operators’ recent annual reports. Both China Telecom and China Unicom, for example, have disclosed

¹⁷ *Notice on Deepening the Telecom Reform, Ministry of Industry and Information Technology, National Development and Reform Commission, Ministry of Finance* (May 24, 2008) at Section II.

¹⁸ *Id.* at Section III.

¹⁹ *Id.*

²⁰ State Council, *Electronic Information Industry Restructuring and Revitalization Plan* (April 15, 2009) at II.B and III.C.

²¹ *Notification Regarding the Launch of National Indigenous Innovation Product Accreditation Work for 2009* at Section III and Appendix 2 (limiting eligibility to products listed in the 2006 Catalogue of New- and High-Technology Products).

²² The local catalogues are available in Chinese only.

²³ U.S. Trade Representative, “21st U.S.-China Joint Commission on Commerce and Trade: Fact Sheet,” USTR Fact Sheet (December 15, 2011).

²⁴ The U.S.-China Business Council, *China’s JCCT Commitments, 2004-10* (January 21, 2011).

arrangements with their state-owned parent companies (who are not publicly traded and thus not subject to the same disclosure obligations) under which the state-owned parent performs all of the equipment procurement for the telecom operator.²⁵ Indeed, in one financial statement China Unicom described the arrangement as a risk to other shareholders:

Our controlling shareholder, Unicom Group, can exert influence on us and cause us to make decisions that may not always be in the best interests of our other shareholders As our controlling shareholder, it is able to influence our major business decisions through its control of our board of directors. All of our executive directors and executive officers also serve as directors or executive officers of Unicom Group. In addition, our operations depend on a number of services provided by Unicom Group. For example, Unicom Group ... provides equipment procurement services ... to us The interests of Unicom Group and our interests in these transactions may differ and Unicom Group may cause us to make decisions that conflict with the interests of our other shareholders.²⁶

One feature of the procurement services contracts that China Telecom and China Unicom have with their state-owned parents is a two-tiered fee system that differentiates between procurements of imported and domestic telecommunications equipment. China Telecom and China Unicom pay a concession fee to their state-owned parents for the procurement of equipment – the maximum concession fee for the procurement of imported equipment is one percent of the contract value, while the maximum concession fee for the procurement of domestic equipment is three percent of the contract value.²⁷

These arrangements require the telecom operators to provide three times as much financial support to their state-owned parents when they purchase domestic equipment as when they purchase imported equipment. This additional financing creates a strong incentive for state-owned parents to procure domestic, rather than imported, equipment on behalf of their telecom operator subsidiaries. The differentiation may also be designed to allow the state-owned parents to pay higher prices for domestic telecommunications equipment than they would pay for imported equipment in order to support domestic equipment manufacturers. In fact, the average selling price for WDM optical communication systems in China is the highest in the world. As a result, Huawei and ZTE are afforded above market pricing in their protected home market so that they can sell below market overseas.

²⁵ China Telecom 2011 Annual Report at 45, China Unicom 2011 Annual Report at 69.

²⁶ China Unicom 2008 Form 20-F at 10.

²⁷ China Telecom 2011 Annual Report at 45, China Unicom 2011 Annual Report at 69.

There are numerous reports indicating that procurement by the Chinese telecom operators has been a major factor fueling the success of Huawei and ZTE and their ability to grow, finance research and development, and penetrate foreign markets. The three telecom companies spent nearly 400 billion RMB on capital expenditures in 2009, and domestic equipment manufacturers are the dominant suppliers for these projects.²⁸ In 2010, for example, ZTE and Huawei received massive equipment purchases from China Mobile for the rollout of its first Package Transport Network, with each company getting a 35% share of the revenue.²⁹ As one financial analysts' report summarizes the dynamic, "Strong domestic sales have given Chinese equipment vendors ammunition to overtake global rivals to sustain long-term growth."³⁰

2. State Funding through Low-Cost Loans and Insurance

With a strong domestic customer base made possible through discriminatory procurement policies, Huawei and ZTE have built the foundation to enable them to penetrate telecommunications markets around the world. This overseas expansion has been aggressively supported by the provision of low-cost financing from the Government of China, particularly in the form of subsidized export credits and export credit insurance.

As mentioned above, a number of categories of telecommunications hardware are listed in the *2006 Catalogue of Chinese High-Tech Products*. Being listed in the catalogue makes the item eligible for preferential interest rates on export credits from China's Export-Import Bank and the China Development Bank. In addition, the State Council's 2009 Electronic Information Industry Restructuring and Revitalization Plan also called for increased availability of preferential export credits and export credit insurance to the industry as part of the government's stimulus plan.

China is the world's leading provider of export credits. In 2010, the U.S. ExIm Bank estimates that China ExIm issued \$45 billion in new medium- and long-term export credits, more than three times the value of such credits newly issued by the U.S. ExIm Bank.³¹ U.S. ExIm Bank estimates that total export credit financing from the Chinese government, including credits from China ExIm and the China Development Bank, likely exceeds \$100 billion per year.³² China is not, however, a member of the OECD arrangement on export credits. While China ExIm Bank and the China Development Bank reveal little about the terms on which their export credits are offered information about these programs, there are various second-hand reports indicating that the terms of this financing are highly concessional, and below the rates at which OECD member export credit agencies provide financing.³³ In addition, circulars issued by the People's

²⁸ DBS Research Group, "China Telecom Sector" (Feb. 24, 2010) at 5, 31.

²⁹ ZTE, *ZTE and Huawei Claim Lion's Share of China Mobile's PTN Purchasing*, ZTE: Media Focus.

³⁰ DBS Research Group, "China Telecom Sector" (Feb. 24, 2010) at at 1.

³¹ Export-Import Bank of the United States, *Report to the U.S. Congress on Export Credit Competition and the Export Import Bank of the United States* (June 2011) at 11.

³² *Id.* at 113.

³³ See, e.g., Ryan J. Orr and Jeremy R. Kennedy, "Highlights of recent trends in global infrastructure: new players and revised game rules," *Transnational Corporations*, Vol. 17, No. 1 (April 2008) at 108;

Bank of China indicate that interest rates on credits for products listed in the 2006 *Catalogue of Chinese High-Tech Products* are typically two percentage points below the People's Bank's normal benchmark rate.³⁴ The U.S. ExIm Bank has concluded: "Most of the terms and conditions of their [China ExIm Bank's] financing did not and do not fit within the OECD guidelines."³⁵

Huawei and ZTE have been major beneficiaries of generous export credit support from the Government of China. The companies have received tens of billions of dollars in credit lines from China ExIm and the China Development Bank – amounts that exceed their total annual revenue and enable the companies to aggressively outbid competitors in overseas markets.

In 2009, Huawei received a \$30 billion line of credit from the China Development Bank, a government-owned bank.³⁶ Huawei describes the credit line as an export buyer's credit – that is, financing available to Huawei's overseas customers to finance their purchases of equipment from Huawei.³⁷ The terms of the financing are not public, but are reported to be extremely favorable. According to one European industry source, "Huawei arranges for a seven-year loan from China Development Bank for equipment, where for the first three years operators make no upfront payment, but the company gets paid by the bank immediately."³⁸

Also in 2009, ZTE secured a line of credit from China's Export-Import Bank totaling \$10 billion, and a line of credit from the China Development Bank of \$15 billion.³⁹ While ZTE reports that interest rates on loans from China Development Bank and China Export-Import Bank range from 3 to 4 percent, it is possible those loans have deferred payment terms as the China Development Bank loans to Huawei are reported to have.⁴⁰ For example, an article on China ExIm's backing of a 2010 sale by ZTE to Canada's Public Mobile notes that ZTE's rivals claimed such loans are offered at rates as low as zero percent.⁴¹

State-owned Chinese banks have also supported Huawei and ZTE by conditioning loan packages to struggling foreign telecom operators on the procurement of Chinese

Deborah Brautigam, *China's African Aid: Transatlantic Challenges*, The German Marshall Fund of the United States (April 2008) at 25-26.

³⁴ See, e.g., *Circular of the People's Bank of China on Adjusting Financial Institution Benchmark Deposit and Lending Rates of RMB*, YINFA [2010] No. 294 (Oct. 19, 2010).

³⁵ Export-Import Bank of the United States, *Report to the U.S. Congress on Export Credit Competition and the Export Import Bank of the United States* (June 2010) at 99.

³⁶ See, e.g., "China Development Bank Enhances Support to Huawei," TradingMarkets.com (Sept. 23, 2009).

³⁷ "FAQ," Huawei website, available on-line at <http://www.huawei.com/facts-beta/faq-1.do>.

³⁸ Venkatesha Babu, "Running Scared of Huawei," Livemint.com (Feb. 17, 2010).

³⁹ "ZTE Bags Another \$10B in Credit," *Light Reading Asia* (May 22, 2009); "China Development Bank Provides ZTE US\$15 Billion Credit Line," *Mobile Tech News* (Mar. 23, 2009).

⁴⁰ ZTE 2009 Annual Report at 192.

⁴¹ "ZTE Bankrolls Canadian Mobile Network," *Light Reading Asia* (June 24, 2010).

equipment. In 2010, Indian mobile operator Reliance Communications (“Rcom”) secured \$1.1 billion in financing from a consortium of Chinese state-owned banks, including China ExIm, the China Development Bank, the Industrial and Commercial Bank of China and other Chinese lenders.⁴² The loan, which was provided for a term of seven years at five percent interest and helped Rcom avoid default, reportedly included conditions requiring Rcom to use \$600 million of the financing to acquire network equipment from ZTE and Huawei.⁴³ The Rcom case does not appear to be the first instance in which Chinese financial institutions have propped up or bailed out foreign telecom operators in return for agreements to purchase equipment from Huawei. Other examples include start-up funding to a Polish operator, a bank-backed leasing arrangement with H3G in Austria, and a \$1 billion loan to America Movil in 2009.⁴⁴

Export credits and other forms of conditional funding to foreign telecom operators are not the only form of state-backed financing Huawei and ZTE enjoy. As mentioned above, the optical equipment industry is an “encouraged” industry and thus eligible for preferential loans from state-owned banks in China, and the 12th Five-Year Plan calls for even more aggressive direction of subsidized financing to support this “strategic and emerging” industry. Both Huawei and ZTE report large increases in their borrowing in 2011. Huawei, for example, increased its global sales revenue by an impressive 11.7% from 2010 to 2011, but the volume of its short- and long-term lending grew nearly five times faster, rising by 56.9%.⁴⁵ ZTE increased its global sales revenue even more rapidly than Huawei, by 23% from 2010 to 2011 – but its borrowing rose even more quickly, with short-term loans outstanding rising by 70% and long-term loans more than quadrupling in volume.⁴⁶ While neither firm discloses the extent to which these loans are from China’s state-owned banks (which account for 80% of China’s banking sector), ZTE does note the following regarding its interest rate risk exposure: “... the total amount of interest payments owed by the Group will vary as a direct result of any fluctuations in the loan interest rates determined by the State,”⁴⁷ indicating much if not all of the firm’s borrowings are from state-owned banks.

Huawei and ZTE also benefit from access to government-backed export credit insurance from China’s export insurance agency, Sinosure. Because optical equipment is listed in China’s catalogues of high-tech equipment, it is eligible for preferential terms from Sinosure on non-payment insurance.⁴⁸ Companies that manufacture equipment listed in the high-tech catalogues are entitled to higher approval limits and maximum

⁴² “Chinese lenders bailout RComm,” *International Financing Review*.

⁴³ *November 2010 China Telecom Newsletter*, Information Gatekeepers, Inc., Vol. 17 No. 11 at 6. See also “Rcom to buy equipment worth \$600 m from Huawei, ZTE,” *The Hindu*; “Chinese loans for Indian telecom firm raise eyebrows,” *The Hindu*.

⁴⁴ European Metalworkers’ Federation, *Fair trade in the telecoms industry* (adopted Nov. 23 – 24, 2011) at 8-9.

⁴⁵ Huawei 2011 Annual Report at 6, 21.

⁴⁶ ZTE 2011 Annual Report at 17, 72.

⁴⁷ ZTE 2011 Annual Report at 85.

⁴⁸ *Notice on the Implementation of the Strategy Promoting Trade Through Science and Technology by Utilizing Export Credit Insurance*, Doc. No. Shang Ji Fa [2004] No. 368.

discounts on premium rates.⁴⁹ In 2009, Sinosure announced Comprehensive Strategic Cooperation Agreements with Huawei and ZTE wherein Sinosure agreed to provide short-, medium-, and long-term export credit insurance to assist them in expanding their export businesses.⁵⁰ The premiums for the insurance offered to Huawei and ZTE appear to be at concessional rates. For example, Barclays Capital worked with Sinosure to guarantee \$127 million in export financing to Huawei in 2011, and the bank noted that it was “able to achieve a more competitive premium than originally expected.”⁵¹

Unfortunately, there does not appear to be public information available regarding the premiums paid by Huawei and ZTE for export credit insurance from Sinosure or any losses incurred by the companies that were covered by Sinosure. ZTE does report some instances in which customers failed to make the full payment owed that are currently under litigation or arbitration, indicating that losses may be occurring which may be covered by Sinosure.⁵² Sinosure may also have been involved in certain financing guarantees to foreign customers reported by ZTE, including a guarantee of 50 million RMB for a term of twelve years to Djibouti Telecom S.A. in 2006 and a guarantee of \$3 million for a term of six-and-a-half years to Benin Telecom S.A. in 2007.⁵³ Huawei also reports that there are instances where the credit risk for a particular customer may become unacceptably high.⁵⁴

3. Other Government Subsidies to Huawei and ZTE

Huawei and ZTE have also benefited from a variety of other forms of government support, including direct grants, preferential tax treatment and equity infusions. In 2010, Huawei reported receiving RMB 433 million in unconditional government grants and RMB 545 million in grants that were conditional on completing certain research and development projects.⁵⁵ In 2009, Huawei reported receiving \$129 million in government grants.⁵⁶ ZTE received RMB 471 million in government grants, contract penalty income, and other miscellaneous gains in 2010, according to its annual report.⁵⁷ In 2009, ZTE reported receiving \$92 million in government subsidies, including grants, support for technology development, and tax subsidies.⁵⁸ Neither company has disclosed the volume of government grants received in 2011.

⁴⁹ *Id.*

⁵⁰ “Sinosure Inked Comprehensive Strategic Cooperation Agreements with ZTE, Huawei,” Sinosure.com.

⁵¹ “Telkom secures \$127m loan for mobile expansion,” *Engineering News* (Jan. 21, 2011).

⁵² ZTE 2009 Annual Report at 99.

⁵³ ZTE 2011 Annual Report at 117, 367.

⁵⁴ Huawei 2009 Annual Report at 16.

⁵⁵ Huawei 2010 Annual Report 37.

⁵⁶ Huawei 2009 Annual Report at 32.

⁵⁷ ZTE 2010 Annual Report 315.

⁵⁸ ZTE 2009 Annual Report at 200 and 203 (some reported as non-operating income, others reported as operating income).

In addition, telecom equipment manufacturers that qualify as high- and new-technology enterprises are eligible for lower across-the-board tax rates. ZTE reports that numerous subsidiaries enjoy a 50% reduction in their income tax rates due to this status – other subsidiaries have been granted temporary tax holidays based on this status or additional provincial and local tax incentives.⁵⁹ China also refunds VAT taxes paid to companies in certain industries, including rebates on software procurement.⁶⁰ ZTE reports receiving 1.9 billion RMB in such refunds and other tax subsidies in 2011.⁶¹ While Huawei does not disclose its Chinese tax rate or the eligibility of any of its operations for preferential treatment, its effective tax rate for its global operations 2011 was 6.5%, far below the statutory rate in China of 25%.⁶²

Huawei and ZTE have also benefitted from direct equity infusions from the Government of China or supported by state-owned financial institutions. Huawei received an infusion of \$5.8 billion from its equity holders in 2009.⁶³ The company is 99 percent held by the union of its employees.⁶⁴ There is very little information about the true ownership structure of Huawei and the nature of its employees' ownership of the company. However, in China, all unions must be part of the All China Federation of Trade Unions, a public entity associated with the Communist Party. In addition, numerous commentators have noted the strong ties between Huawei's founder and the Government of China.⁶⁵ The equity infusion was equal to nearly four percent of the company's sales revenue in 2009.

In 2008, ZTE issued 40 billion RMB in bonds cum warrants, which were guaranteed by the China Development Bank, a state-owned bank.⁶⁶ The bonds, which bear an interest rate of 0.8%, have permitted the company to fund major capital investments. In addition to being backed by a major state-owned bank, it appears that many of the major purchasers of the bonds are themselves state-owned firms.⁶⁷ The RMB 40 billion the company has been able to raise through the bond issuance was thus directly supported by government guarantees and government purchases, resulting in a major government-backed infusion of funds to the company.

4. Conclusion

⁵⁹ ZTE 2011 Annual Report at 330 – 331.

⁶⁰ State Council, *Certain Policies to Encourage the Development of Software Enterprise and the IC Industry*.

⁶¹ ZTE 2011 Annual Report at 324.

⁶² Huawei 2011 Annual Report at 32.

⁶³ Huawei 2009 Annual Report at 21.

⁶⁴ Huawei 2009 Annual Report at 41.

⁶⁵ *The National Security Implications of Investments and Products from the People's Republic of China in the Telecommunications Sector*, U.S.-China Economic and Security Review Commission Staff Report (Jan. 2011) at 15 – 18.

⁶⁶ ZTE 2009 Annual Report at 193.

⁶⁷ ZTE 2011 Annual Report at 109.

Aggressive government support has permitted Huawei and ZTE to grow exponentially in recent years. By protecting its domestic telecommunications market for national champions, the Government of China has restricted competition and provided a guaranteed foundation for Huawei and ZTE's growth. Massive export credits and export credit guarantees have propelled the firms' expansion in overseas markets, where the sheer volume of low-cost funding available from China's state-owned banks overwhelms potential competitors. Huawei and ZTE have also benefitted from direct government grants, preferential tax treatment, and government-backed equity infusions.

The trade-distortions resulting from this support have not gone unnoticed by China's trading partners. In 2010, the EU initiated an investigation into subsidized imports⁶⁸ of wireless wide area networking modems from China after receiving a complaint from Option N.V., a Belgian producer of such wireless modems.⁶⁹ The complaint primarily targeted Huawei and ZTE, and stated that the Chinese exporters were able to flood the European market with low-priced products due to heavy subsidization by the Chinese government.⁷⁰ Following a preliminary investigation, public reports state that the EU was proposing significant duties of more than €30 for the imported Chinese modems, which normally only cost between €20 and €30 – meaning the extent of subsidization found was in the triple digits.⁷¹ Prior to imposition of the duties, Option N.V. and Huawei entered into a “cooperative agreement,” which included Huawei paying €33 million to license some of Option's software and Huawei purchasing Option's subsidiary, M4S, for €8 million.⁷² In the wake of this agreement, and “in the spirit of future collaboration,” Option then withdrew its complaints and the investigation was terminated.⁷³ In the past few weeks, however, it appears the EU may be contemplating

⁶⁸ The anti-subsidy investigation followed initiation of both an anti-dumping investigation and a safeguard investigation. *Notice of initiation of an anti-dumping proceeding concerning imports of wireless wide area networking (WWAN) modems originating in the People's Republic of China*, Official Journal of the European Union (2010/C 171/08) (June 30, 2010); *Notice of initiation of a safeguard investigation under Council Regulations (EC) No 260/2009 and (EC) No 625/2009 concerning imports of wireless wide area networking (WWAN) modems*, Official Journal of the European Union (2010/C 171/07) (June 30, 2010).

⁶⁹ *Notice of initiation of an anti-subsidy proceeding concerning imports of wireless wide area networking (WWAN) modems originating in the People's Republic of China*, Official Journal of the European Union (2010/C 249/08) (September 16, 2010).

⁷⁰ Matthew Dalton, “Huawei Pays Option To Go Away,” WSJ Blogs (November 3, 2010).

⁷¹ *Id.*

⁷² *Id.* See also Caroline Gabriel, “Option Drops Huawei Suit and Signs R&D Deal,” Rethink Wireless (October 27, 2010).

⁷³ Matthew Dalton, “Huawei Pays Option To Go Away,” WSJ Blogs (November 3, 2010). See also *Commission Regulation (EU) No 209/2011 of 2 March 2011 terminating the anti-dumping and anti-subsidy proceedings concerning imports of wireless wide area networking (WWAN) modems originating in the People's Republic of China and terminating the registration of such imports imposed by Regulation (EU) No 570/2010 and (EU) No 811/2010*, Official Journal of the European Union (March 3, 2011); *Notice of termination of the safeguard investigation initiated under Council Regulations (EC) No 260/2009 and (EC) No 625/2009, concerning imports of wireless wide area networking (WWAN) modems*, Official Journal of the European Union (2011/C 24/09) (January 26, 2011).

re-opening the investigation.⁷⁴

C. WHAT IS THE IMPACT OF THE RISE OF THESE GOVERNMENT SUPPORTED ENTITIES

1. Impact on US Economy and Optical Industry

The rapid growth of Huawei and ZTE with massive state support has undermined competition and poses a threat to innovation in the optical equipment industry. The firms have grown exponentially over recent years: Huawei's annual revenues more than tripled from 2006 to 2011, growing from 66 billion RMB to 204 billion RMB.⁷⁵ ZTE's annual sales revenue also more than tripled from 2006 to 2010, rising from 23 billion RMB to 86 billion RMB.⁷⁶ From 2010 to 2011, Huawei overtook Alcatel-Lucent to become the top optical network equipment vendor in the world; ZTE leaped over Fujitsu to become the world's fourth largest.⁷⁷

This astronomical growth is due in large part to Huawei and ZTE's ability to aggressively underbid their competitors with the backing of state support. As noted above, the European Union preliminarily found that government subsidies to the two firms may be as high as 100% or more of their sales revenue. Another article states that Huawei and ZTE are able to underbid their competitors in global markets by 30 to 40% on a regular basis.⁷⁸

Huawei and ZTE are consistently rated by global telecom service providers as superior to their competitors in the optical network equipment industry in one important respect: price.⁷⁹ In a major 2011 survey of global telecom operators, a full 83% of respondents identified Huawei as among the top three firms in price leadership, with ZTE named by 67% -- the next most frequently mentioned firm was only named by 28% of respondents.⁸⁰ By contrast, neither firm was the most frequently mentioned on other important industry metrics such as technology, service and support, management tools, or research and development.⁸¹

The fact that the number one and number four vendors in the industry fall behind in each of these categories, and yet are able to prevail largely on price, indicates that their aggressive pricing behavior is thwarting the ability of the industry to innovate. The vendors rated highest for their technology – Ciena, Alcatel-Lucent, and Infinera – saw

⁷⁴ "China's Huawei, ZTE face EU action on telecom subsidies: FT," Reuters.com (May 27, 2012).

⁷⁵ Huawei 2010 Annual Report at 4; Huawei 2011 Annual Report at 6.

⁷⁶ ZTE 2010 Annual Report at 18; ZTE 2011 Annual Report at 17.

⁷⁷ "Optical network sales up 8% as big vendors surge," optics.org (Feb. 20, 2012).

⁷⁸ Iain Mills, "The Rise of China's Telecoms: Part II," *World Politics Review* (Apr. 12, 2011).

⁷⁹ Andrew Schmitt, "Global Service Providers Identify Optical Equipment Leaders," Infonetics Research Survey Excerpts (2011) at 8.

⁸⁰ *Id.*

⁸¹ *Id.*

their revenues grow more slowly than either Huawei or ZTE last year,⁸² ceding market position to firms that don't offer better solutions, but can undercut the competition on price. As Cisco CEO John Chambers remarked earlier this year, "in the long run, Huawei is the company's toughest competitor. Huawei will always compete on price."⁸³

The list of projects lost to Huawei and ZTE due to aggressive underbidding is a long one. Most of these projects have been won outside of the U.S. From 2005 through 2010, Huawei and ZTE won over \$3 billion in contracts from African telecom operators in Algeria, Angola, Ethiopia, Ghana, Libya, Nigeria, and South Africa.⁸⁴ A few notable examples in the U.S. include Huawei's agreements with Leap Wireless in 2007 and 2009, a supplier agreement with Cox Communications in 2009, and an agreement with Clearwire in 2009; in 2010, ZTE announced expectations to begin selling equipment in the U.S. market by the end of the year.⁸⁵ In some cases in which the amount by which Huawei or ZTE underbid competitors to win overseas contracts has been disclosed, the margins of underselling are dramatic. In one 2008 example, Huawei won a network contract in Oman in which its bid was less than a third of rivals Ericsson and Nokia Siemens.⁸⁶

Each of these contracts represents a lost opportunity to American producers and American workers. As other optical network equipment providers have lost sales and market share, lost jobs have resulted. In July of last year, Cisco Systems announced it was laying off 9% of its global workforce in order to cut \$1 billion in expenses – increased competition in the switching and router market was blamed for the layoffs.⁸⁷ In 2007, Alcatel-Lucent aimed to cut costs by reducing its manufacturing presence – 12,500 workers worldwide lost their jobs, including hundreds in the United States.⁸⁸ The company has continued to struggle, however, and additional U.S. workers producing electrical switching equipment for Alcatel-Lucent were laid off and certified for trade adjustment assistance earlier this year.⁸⁹

The loss of ground by major western equipment vendors is also undermining these firms' ability to keep investing in innovation. Robust research and development programs are vital to the future of the industry. Unfortunately, in the past few years

⁸² *Id.* See also "Optical network sales up 8% as big vendors surge," optics.org (Feb. 20, 2012).

⁸³ "Cisco counters Huawei with Lightwire acquisition," ovum.com (Feb. 12, 2012).

⁸⁴ Daouda Cisse, "Going global" in *growth Markets-Chinese investments in telecommunications in Africa*, Center for Chinese Studies Policy Briefing (April 2012) at 3.

⁸⁵ *The National Security Implications of Investments and Products from the People's Republic of China in the Telecommunications Sector*, U.S.-China Economic and Security Review Commission Staff Report (Jan. 2011) at 23-24.

⁸⁶ "Huawei undercuts NSN and Ericsson to take Oman 3G contract," Telegeography.com (Jan. 25, 2008).

⁸⁷ Charles Babcock, "Cisco Layoffs: 6,500 Jobs Cuts, \$1 B Expenses Trimmed," *InformationWeek* (July 18, 2011).

⁸⁸ Lauren K. Ohnesorge, "Signs point to additional layoffs at Alcatel-Lucent," *Triangle Business Journal* (March 9, 2012).

⁸⁹ TAA Certification No. 81349, available on-line at: <http://www.doleta.gov/tradeact/taa/taadecisions/taadecision.cfm?taw=81349> .

major western equipment providers have been forced to reduce the share of their revenues devoted to research and development, threatening their ability to stay ahead of the curve and innovate the next generation of optical network technology. If these trends are allowed to continue, we will quickly lose our most important competitive advantage in this industry, which is our widely recognized technological edge. It is not only individual companies that will suffer. The failure to innovate will also impact the economy at large, which depends on a rapidly improving telecommunications infrastructure to raise our productivity, efficiency, and the quality of life.

Moreover, if predatory pricing trends continue, the last vendors standing will likely be Huawei and ZTE. Without any viable domestic vendors to compete with, they will raise their prices dramatically, causing further economic harm.

2. What are some of the Security Risks

The second reason we should be concerned about the growth by Huawei and ZTE are the security concerns that they pose to optical networks. There are three principal areas of concern that relate to the providers of optical networks, including the threats of:

1. disruption or disabling the optical network,
2. eavesdropping or other unauthorized information gathering; and
3. disruption to adjacent or dependent networks.

Disruption of Optical Networks: optical networks are controlled by network management software (NMS) that is developed and supplied by the optical equipment vendor. This management software is extremely complicated as it manages the equipment and connections for the optical network. Typically the NMS software package is comprised of anywhere from several hundreds of thousands to millions of lines of source code and encoded in so-called “machine language,” which, as a practical matter is nearly impossible to decipher. As a result, it is difficult for anyone other than the developer of this software to fully understand its functionality and integrity.

If an optical vendor were so interested, it would be possible for them to include code into their NMS that would enable them to temporarily or permanently disable their NMS. The result of this action would be the temporary loss of any connectivity over this optical system for a period of several days to potentially months. The overall impact of this system would depend on the size of the rogue optical vendor’s network deployments. If the network equipment provider had a substantial number of customers it could severely impact the interconnectivity of the US and cause severe economic distress. In particular, any system that utilizes the optical network (internet, phones, data, etc.) would lose connectivity and have to be re-routed onto another optical network. If there was no available bandwidth with other optical networks, then the signal would be lost.

The supplier of optical equipment has access to detailed network design information, such as information on the locations of where the critical telecommunications devices are located and how the optical network is designed and

operates. This same information would allow a rogue optical vendor to more effectively make any cyber-attack.

Illegal Information Gathering (Cyber-snooping): The information that is transported across optical networks could be accessed by a rogue optical equipment vendor. For example, such a vendor could include backdoors or other software devices into their network management software to enable the vendor to gather or copy data that is being transmitted over the optical vendor. It would be very difficult for the end user to determine that their information is being copied and it is unlikely that the US network operator would discover this intrusion. In particular, an operator would have to be specifically looking for this type of intrusion and would have to specially equip the network with complex and expensive monitoring gear to detect it. Moreover, they would need to know exactly where to look since instrumenting an entire network this way would be prohibitive.

Inject Malware into other support Systems: Since optical network are the pipes that carry most critical network information, it is possible to inject malicious code into attached systems that could damage these adjacent systems. Adjacent systems would include electrical systems, and other critical infrastructure services.

For these reasons, the House intelligence committee announced in November of last year that it would examine “the threat posed by Chinese-owned telecommunications companies working in the United States, and the government’s response to that threat.”⁹⁰

I would also note that the Chinese optical vendors, such as Huawei’s Submarine Cable Company have become much more active in the subsea communications sector. The opportunity for rogue vendor activities that I discussed above for terrestrial systems would be equally applicable for subsea optical networks.

D. CONCLUDING REMARKS

The rapid growth of China’s optical equipment suppliers, fueled by protectionist government policies at home and lavish government support to expand overseas, poses an increasing threat to American innovation and job creation. The pattern is similar to what we have seen in many other industries.

In the solar industry, for example, China protected its home market for domestic producers and propped up those producers’ exports with tens of billions of dollars of state-backed loans, including export credits. As a result, Chinese producers quickly came to dominate the world market and world prices plummeted by 40% in 2009 and later. No matter how innovative their technology or how much better their product may perform and conserve resources over the long-run, American producers were forced to shut their doors one after another as prices dropped below their costs to produce. In 2011, the U.S. lost a full 20% of its domestic solar capacity due to bankruptcies and other shut downs.

⁹⁰ <http://www.bloomberg.com/news/2011-11-17/house-intelligence-panel-probing-chinese-phone-companies-in-u-s-.html>

The solar industry has finally taken action to defend itself from China's predatory and unfair trade practices, but for many firms and workers it is too late.

It is interesting to note the approach taken by countries such as Australia and Germany.

Australia: The fact that China is Australia's biggest trading partner did not stop the Australian federal government from banning Huawei from participation in tenders to supply equipment to the national broadband network (NBN). The \$37.6 billion (USD) NBN project aims to bring fiber optic broadband connectivity to 93 percent of Australian homes by 2020. The Australian government prohibited Huawei from tendering for the multi-billion supply contracts due to security concerns, specifically cyber-attacks originating in China. The government based its decision on advice from the Australian Security Intelligence Organization. Australia's top signals intelligence expert said there was "no doubt" Huawei partnered with China's espionage services.

Similarly in **Germany**, earlier this year, Huawei and other Chinese vendors were excluded from bidding for business at Germany's national research and education network (DFN) where Huawei was an incumbent supplier. The Chinese companies were not considered due to security concerns.

Our ability to innovate the telecommunications infrastructure of the future with U.S. technology, U.S. intellectual property, and U.S. workers depends on our ability to confront China's state-capitalist model that drove our solar industry to the brink and is now distorting world markets for optical equipment. China's intentions are clear: they have announced their intention to intensify government support for the industry and to make their national champions world market leaders. Our response must be equally clear to ensure that competition in this vital sector is not based on which government is willing to lavish the most resources on its producers, but on the quality of our products, the strength of our innovation, and the productivity of our workers.

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