

August 27, 2018

**VIA ECFS**

Marlene H. Dortch, Secretary  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, DC 20554

Re: **Written Ex Parte**  
WC Docket 18-89; In the Matter of Protecting Against National Security Threats to the  
Communications Supply Chain Through FCC Programs

Dear Ms. Dortch:

On August 20, 2018, Huawei Technologies Co., Ltd. and Huawei Technologies USA, Inc. (“Huawei”) filed comments at the Federal Trade Commission (“FTC”) in response to Initiative #756, which seeks comment on “competition and consumer protection issues in communication, information, and media technology networks.” Huawei provides as an attachment to this *ex parte* letter a copy of its FTC filing and supporting expert report to supplement the record in the above-captioned docket.

If you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,

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/s/

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ATTACHMENT

**ATTACHMENT**

Huawei Technologies Co., Ltd. and Huawei Technologies USA, Inc.  
August 20th, 2018 FTC Filing

**Federal Trade Commission  
Competition and Consumer Protection in the 21st Century Hearings  
Project Number P181201**

**Comments of Huawei Technologies Co., Ltd. and Huawei Technologies USA, Inc.**

**August 20, 2018**

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## I. INTRODUCTION

Huawei Technologies Co., Ltd. and Huawei Technologies USA, Inc. (collectively, “Huawei”) appreciate this opportunity to submit comments to the U.S. Federal Trade Commission (“FTC”) on the topic of “competition and consumer protection issues in communication, information, and media technology networks” in advance of the FTC’s public hearings on competition and consumer protection in the 21st Century, scheduled for the fall of 2018.

As a leading industry group, GSMA, recently noted:

With mobile services reaching near-ubiquity and mobile internet access spreading quickly, the digital revolution is empowering citizens and reshaping society all over the world. . . . The next generation of mobile networks, 5G, promises boundless connectivity and intelligent automation, taking network performance to a new level and providing a platform on which new digital services and business models can thrive.<sup>1</sup>

In the transition to a digital economy, a robust telecommunications infrastructure is critically important. However, building advanced telecommunications networks is not easy; it requires continuous innovation and the investment of billions of dollars.

Open competition promotes both innovation and investment. Unfortunately, competition in U.S. telecommunications markets has not been fully open for a long time. Instead, Huawei and certain other foreign entities have faced, and continue to face, regulatory intervention that has inhibited their ability to compete on the merits. Specific examples of such intervention include:

- In November 2010, Commerce Secretary Gary Locke called Sprint’s CEO to “discuss concerns about awarding [a multi-billion-dollar contract] to a Chinese firm.” Subsequently, Sprint dropped plans to consider Huawei for the contract.<sup>2</sup>

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<sup>1</sup> GSMA, The Mobile Economy 2018 54, <https://www.gsma.com/mobileeconomy/wp-content/uploads/2018/05/The-Mobile-Economy-2018.pdf>.

<sup>2</sup> See Joann S. Lubin & Shayndi Raice, *Security Fears Kill Chinese Bid in U.S.*, WALL STREET JOURNAL, Nov. 5, 2010, <https://www.wsj.com/articles/SB10001424052748704353504575596611547810220>.

- In February 2018, six U.S. intelligence chiefs testified before the Senate cautioning Americans from buying Huawei products.<sup>3</sup>
- In January 2018, AT&T and Verizon decided not to market Huawei smartphones, in particular the popular new Mate 10 Pro, reportedly due to political pressure.<sup>4</sup> Subsequently, Best Buy, the nation’s largest electronics retailer, began to cease sales of Huawei smartphones.<sup>5</sup> Without major carrier support, consumers have substantially greater difficulty finding support for smartphones such as the Mate 10 Pro, which has been described as a “solid all-around Android smartphone.”<sup>6</sup>
- In May 2018, the Department of Defense ordered retail stores on military bases to cease sales of Huawei products.<sup>7</sup>
- In April 2018, the U.S. Federal Communications Commission (“FCC”) issued a Notice of Proposed Rulemaking (“NPRM”) that would “prohibit, going forward, the use of Universal Service Fund monies to purchase equipment or services from any communications equipment or service providers identified as posing a national security risk to communications networks or the communications supply chain.”<sup>8</sup> The preamble to the proposed rule calls out just a few companies by name—including Huawei—as likely posing such a risk.
- In August 2018, the President signed the National Defense Authorization Act for Fiscal Year 2019, which bars all federal agencies from, among other things, purchasing equipment or services from Huawei, ZTE and others, and from contracting with any entity that uses equipment or services provided by these companies as a substantial or essential component of any system.

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<sup>3</sup> Hearing before the Senate Select Committee on Intelligence, Worldwide Threat Assessment of the U.S. Intelligence Community, 115th Cong. (Feb. 13, 2018), <https://www.intelligence.senate.gov/hearings/open-hearing-worldwide-threats-hearing-1>.

<sup>4</sup> See Scott Moritz, Mark Gurman, and Todd Shields, *Verizon Drops Plans to Sell Phones from China’s Huawei, Sources Say*, BLOOMBERG, Jan. 29, 2018, <https://www.bloomberg.com/news/articles/2018-01-30/verizon-is-said-to-drop-plans-to-sell-phones-from-china-s-huawei>; Stephen Shankland, *Verizon-Huawei pact reportedly hit by political pressure*, CNET, Jan. 9, 2018, <https://www.cnet.com/news/verizon-huawei-mate-10-pro-political-pressure-ces/>.

<sup>5</sup> See Roger Cheng, *Huawei Dealt a Blow, Loses Best Buy as Retail Partner*, CNET, Mar. 22, 2018, <https://www.cnet.com/news/huawei-dealt-blow-loses-best-buy-as-smartphone-laptop-smartwatch-retailer/>.

<sup>6</sup> Brian Chen, *Meet the \$800 Smartphone That You Probably Won’t Buy*, NEW YORK TIMES, Jan. 24, 2018, <https://www.nytimes.com/2018/01/24/technology/personaltech/huawei-mate-10-pro-smartphone-review.html>.

<sup>7</sup> See Hamza Shaban, *Pentagon tells U.S. military basis to stop selling ZTE, Huawei phones*, THE WASHINGTON POST, May 2, 2018, <https://www.washingtonpost.com/news/the-switch/wp/2018/05/02/pentagon-tells-u-s-military-bases-to-stop-selling-zte-huawei-phones/>.

<sup>8</sup> Protecting Against National Security Threats to the Communications Supply Chain Through FCC Programs, Notice of Proposed Rulemaking, WC Docket No. 18-89, FCC 18-42 (rel. Apr. 18, 2018), 83 Fed. Reg. 19,196 (May 2, 2018), <https://www.gpo.gov/fdsys/pkg/FR-2018-05-02/pdf/2018-09090.pdf>.

These actions, all purportedly taken to protect “national security” interests, have severely restricted the ability of Huawei and others to compete in the United States. As discussed herein and in comments submitted before the FCC as part of its Proposed Rulemaking,<sup>9</sup> Huawei disputes the notion that it poses a heightened security risk. Moreover, Huawei submits that these actions have been taken with very little attention to the potential competitive impact of excluding it and other firms from the marketplace. They directly harm not only the targeted companies, but also U.S. consumers, who would otherwise benefit from more robust competition. While the expressed goal of protecting national security is laudable, Huawei further submits that this aim can be achieved through less restrictive means. As these comments will make clear, government interference that restricts competition results in significant costs to consumers in the form of higher prices, lower quality, reduced investment, and lower incentives to innovate.

The FTC’s upcoming hearings are an appropriate forum to address legislative and administrative actions that negatively impact competition in U.S. telecommunications markets, as the actions discussed above are not the first, and likely will not be the last, restrictions that result in competitive harm. The FTC has long played an important role as an advocate for competition. In 1974, FTC Chairman Lewis Engman spoke about the inefficiencies of regulation in the transportation industry and the merits of antitrust enforcement, effectively launching the

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<sup>9</sup> Comments of Huawei Technologies Co., Ltd. and Huawei Technologies USA, Inc., In the Matter of Protecting Against National Security Threats to the Communications Supply Chain Through FCC Programs, FCC 18-42, WC Docket No. 18-89, June 1, 2018, <https://ecfsapi.fcc.gov/file/1060161615708/Comments%20of%20Huawei%20Technologies%20Co.%2C%20Ltd.%20and%20Huawei%20Technologies%20USA%2C%20Inc.%20-%20WC%20Docket%2018-89.pdf>. [hereinafter Huawei FCC Comments]; Reply Comments of Huawei Technologies Co., Ltd. And Huawei Technologies USA, Inc., In the Matter of Protecting Against National Security Threats to the Communications Supply Chain Through FCC Programs, FCC 18-42, WC Docket No. 18-89, July 2, 2018, [https://ecfsapi.fcc.gov/file/107021419415731/107110\\_98178616v1\\_FINAL%20-%20Huawei%20Reply%20Comments%20-%20National%20Security%20Docket%2018-89.PDF](https://ecfsapi.fcc.gov/file/107021419415731/107110_98178616v1_FINAL%20-%20Huawei%20Reply%20Comments%20-%20National%20Security%20Docket%2018-89.PDF) [hereinafter Huawei FCC Reply Comments].



FTC’s modern advocacy program.<sup>10</sup> Today, the FTC regularly publishes amicus briefs and advocacy letters to regulators that promote competition, and numerous examples are readily available on the FTC’s website through its Office of Policy Planning.<sup>11</sup> Although the Commission has limited powers to directly remediate overreaching government regulation,<sup>12</sup> Huawei urges the Agency to use the powers that it *does* have—namely the power of evidence, expertise, and persuasion—to prevent an unjust burden on consumers and inefficiencies in U.S. telecommunications markets.

Indeed, in this specific instance, the Commission may have a particularly important role to play. The purported risk of harm to national security interests that underlies the actions described above appears in many respects to be economic, expressed as a concern that the U.S. may become too dependent upon certain foreign suppliers for telecommunications equipment, which could provide foreign governments with economic leverage. While Huawei submits that

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<sup>10</sup> Lewis A. Engman, Address at the 1974 Fall Conference of the Financial Analysts Federation (Oct. 7, 1974).

<sup>11</sup> Federal Trade Commission, About the FTC, Bureaus and Offices, Office of Policy Planning, <https://www.ftc.gov/about-ftc/bureaus-offices/office-policy-planning>.

<sup>12</sup> See, e.g., Commissioner Maureen K. Ohlhausen, *China’s Fair Competition Review: Insights from the U.S. Experience* at 4-5 (October 27, 2016), [https://www.ftc.gov/system/files/documents/public\\_statements/993533/ohlhausen\\_-\\_faircomp\\_speech\\_10-27-16.pdf](https://www.ftc.gov/system/files/documents/public_statements/993533/ohlhausen_-_faircomp_speech_10-27-16.pdf) (observing that China’s Antimonopoly Law lacks the constraints of the state action doctrine and that “the Fair Competition Review Mechanism allows Chinese competition officials to challenge anticompetitive government action broadly. Further, the Review Mechanism requires departments under the State Council and provincial governments to include a competition review when drafting new regulations and policies. If they fail to include such a review, they cannot submit their proposals to higher authorities for approval. They must also gradually phase out existing anticompetitive regulations and practices.”). See also World Bank Group, *Transforming Markets Through Competition*, at 9-16 (noting successes and powers of competition agencies in Malawi, Kenya, Indonesia, Portugal, New Zealand, Mexico, Singapore, Greece, Iceland, South Africa, Israel, Moldova, and Finland); PaRR, “China NDRC publishes nine cases involving abuse of administrative power,” Dec. 27, 2017 (discussing cases involving abuse of administrative power to hinder market competition in China); PaRR, “Guangdon court Sware’s decision a major victory of administrative monopolies—analysis,” Aug. 21, 2017 (describing a decision by the Guangdong High People’s Court “to uphold a lower court’s ruling that the provincial education department abused its administrative power” as “a major step forward in combating administrative monopolies”).

such concerns are unfounded, the FTC is uniquely positioned to help assess the likelihood and scope of such harm, and to lend its expertise to policymakers.

We respectfully submit these comments for consideration, and request that the Commission hold a hearing to allow for more robust discussion of the effects of regulatory intervention in telecommunications markets.

## **II. COMPANY BACKGROUND**

### **A. Huawei Technologies Co., Ltd. Business Overview**

Huawei is a global leader in smart devices and information and communication technology (“ICT”) products and services. Huawei was established in 1987 through private investment in Shenzhen, Guangdong Province, where it is still headquartered. Initially, Huawei sought to provide connectivity to unserved rural areas of China, and it has since expanded into metropolitan areas and the global marketplace. In 2005, Huawei’s overseas revenue surpassed Chinese market revenue for the first time. Today, 45 of the world’s 50 largest telecommunications providers are Huawei customers and altogether Huawei supports more than 500 major telecommunications operators across more than 170 countries.

Huawei has always been, and remains today, a private company wholly owned by its founder and its employees through an Employee Stock Ownership Plan, in which 80,818 employees participated at the end of 2017. Huawei’s corporate governance structure reflects the breadth of its operations and spans a number of different groups and committees from various countries. In fact, Huawei’s increasingly global presence has attracted top international talent for oversight of its business, including John Suffolk, Huawei’s global head of cybersecurity, formerly employed by the U.K. government as Her Majesty’s Government Chief Information Officer. As of 2017, more than one third of Huawei’s corporate fellows are not Chinese citizens.

At the highest level, Huawei's Board of Directors is comprised of private citizens only and oversees, among other things: reviewing and approving all plans for entering industries or strategic changes; organizational restructuring; financial policies and business transactions; internal controls and operational compliance systems; and the employment of senior management. Huawei draws upon the support and expertise of globally respected professional firms for its corporate operations, such as IBM for processes and technology, Accenture for customer relationship management, the Hay Group for HR processes, PricewaterhouseCoopers for finance, and KPMG, who has acted as Huawei's independent external auditor for nearly two decades.

Huawei offers integrated solutions in four primary sectors: telecommunications networks, information technology, smart devices, and cloud services. Huawei supports international carriers across the globe with numerous telecommunications products and services, including its Internet of Things ("IoT"), All-Cloud, and 5G offerings. Similarly, Huawei's enterprise business is utilized by nearly 200 Fortune Global 500 companies through products such as cloud, big data, OpenStack software tools, data centers, and IoT. As a top three international phone maker, Huawei also provides world-class smart devices to global consumers, shipping 153 million smartphones in just 2017. Huawei's Cloud Business Unit includes a service portfolio of 99 services across 14 major categories, with applications in manufacturing, healthcare, e-commerce, and connected vehicles.

Huawei generates approximately 60% of its revenue outside of Mainland China, reflecting a substantial global footprint and investment in multinational operations, including through geographic diversity of its supply chain. As a result, Huawei procures components, spares, equipment, software, and services supporting its products from suppliers located across the world. In the last 4 years, for example, Huawei has procured more than \$33 billion from over 1,600 U.S. suppliers.

## **B. Huawei Technologies USA, Inc. and Huawei Device USA Inc. Business Overview**

Launched in 2001 and restructured in 2011, Huawei's U.S. operations include Huawei Technologies USA, Inc. ("Huawei Technologies USA"), comprised of the carrier, enterprise, and solar business groups; Huawei Device USA Inc., which focuses on Huawei's consumer business; and Futurewei Technologies, Inc. ("Futurewei"), Huawei's Research & Development ("R&D") arm in the U.S. (collectively, "Huawei-USA"). All are Texas corporations headquartered in Plano, Texas and governed by U.S. laws.

Although Huawei-USA accounts for a comparably small portion of Huawei's global revenue, Huawei has remained committed to serving U.S. carriers, consumers, and suppliers. In 2017, approximately 25% of Huawei's top suppliers for its global operations were U.S.-based. Huawei Technologies USA services 85 active U.S. wireline and wireless carriers, many of whom provide critical connectivity to underserved areas of the U.S. Collectively, Huawei-USA employs over 1,200 employees across 13 offices and six R&D facilities in the U.S., including in Silicon Valley; Bridgewater, New Jersey; Chicago, Illinois; and San Diego, California.<sup>13</sup>

## **C. Huawei Benefits to Consumers**

Huawei has a longstanding, globally-based commitment to innovative design and technological progress. Nearly 45% of its employees are engaged in R&D, on which Huawei invested \$13.8 billion in 2017, ranking it 6th in the world—ahead of Google parent Alphabet.<sup>14</sup> Huawei's R&D efforts are, consistent with Huawei's business vision, an international endeavor, having launched concurrently with its global operations and now spanning 16 research centers, 26

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<sup>13</sup> Huawei: Who We Are, <http://usahuawei.com/who-we-are/facts-and-figures/>.

<sup>14</sup> IRI - The 2017 EU Industrial R&D Investment Scoreboard, <http://iri.jrc.ec.europa.eu/scoreboard17.html#modal-one>.

joint innovation centers, and 45 training centers across countries including the U.S., Canada, the U.K., Pakistan, France, Germany, Colombia, India, Israel, Russia, and Turkey.

Huawei continually seeks to contribute its significant resources to perpetuating a healthy telecommunications ecosystem. For example, Huawei conducts research into changes in industry standards for protecting the integrity and security of networked solutions, and publishes its results in the form of public white papers. Huawei is also actively involved in the formulation of international standards, with membership in more than 360 standardization bodies and industry organizations such as ETSI, 3GPP, and IEEE-SA. For the past decade, Huawei has operated Seeds for the Future (“Seeds”), a global Corporate Social Responsibility program to develop ICT talent and encourage innovation in the telecommunications sector. Seeds has benefitted 30,000 students representing 350 universities in 108 countries, including students from MIT, Stanford, and Carnegie Mellon University.

In the U.S., Huawei’s offerings have provided advanced technology and necessary competition to the U.S. telecommunications infrastructure market. For example, Huawei’s 4T4R Single Radio Area Network (“RAN”) products helped its U.S. carrier clients improve their service area coverage by 30%. In addition, as described in Section V.B., Huawei-USA has allowed for smaller, rural carriers to remain competitive amidst a high-cost wireless infrastructure industry currently dominated by two European companies.

### **III. THE U.S. GOVERNMENT HAS INTERVENED SUBSTANTIALLY IN HUAWEI’S U.S. BUSINESSES**

Although Huawei has developed an international reputation for affordable, quality products, the fact that Huawei is one of “the first Chinese companies to emerge as a global powerhouse” has precipitated exclusionary practices by the U.S. government on the purported

basis of unsubstantiated national security concerns.<sup>15</sup> Huawei has no state ownership and operates independently of the Chinese government—as evidenced by the widespread use of Huawei’s products in over 170 countries across the world, including by close U.S. allies, without undermining any nation’s security. Yet, in the U.S., Huawei still faces ungrounded allegations of state interference. As a result, continual agitation and interference by U.S. government agencies and officials, as described above, have stymied, and continue to stymie, Huawei’s U.S. businesses and operations.

The U.S. government is currently proposing to further restrict Huawei’s U.S. businesses through increasingly broad measures. Again as noted above, in April 2018, the FCC issued its Notice of Proposed Rulemaking in response to a letter by 18 members of Congress raising questions about Huawei and ZTE, to consider a rule that would prohibit the use of funds from the Universal Service Fund to purchase equipment or services from “any communications equipment or service providers identified as posing a national security risk to communications networks or the communications supply chain.”<sup>16</sup> The preamble to the FCC’s proposed rule calls out just a few companies—including Huawei—by name. Moreover, the National Defense Authorization Act for Fiscal Year 2019, which was enacted on August 13, 2018, will, among other things, bar all federal agencies from contracting with any entity that uses equipment or services produced or provided by Huawei or ZTE as a “substantial or essential component ... or as critical technology as part of any system.”<sup>17</sup>

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<sup>15</sup> See, e.g., Sheridan Prasso, *What makes China Telecom Huawei So Scary?*, July 28, 2011, FORTUNE, <http://fortune.com/2011/07/28/what-makes-china-telecom-huawei-so-scary/>.

<sup>16</sup> Protecting Against National Security Threats to the Communications Supply Chain Through FCC Programs, Notice of Proposed Rulemaking, WC Docket No. 18-89, FCC 18-42 (rel. Apr. 18, 2018), 83 Fed. Reg. 19,196 (May 2, 2018), <https://www.gpo.gov/fdsys/pkg/FR-2018-05-02/pdf/2018-09090.pdf>.

<sup>17</sup> John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, § 889(a)(1)(B) (Aug. 13, 2018).

These drastic restrictions have been enacted or contemplated on the basis of fear and other irrational and unfounded considerations, with no credible evidence that Huawei or others pose any real national security risk.<sup>18</sup> Moreover, they are being considered with little regard for the anticompetitive effects that such measures are likely to have on consumers. At the infrastructure level, restricting Huawei as a vendor results in rising costs for rural or smaller carriers, which are then passed on to consumers. Similarly, U.S. government intervention has left U.S. consumers without access to the same quality options for smart devices and network technology products as consumers in markets such as Europe and Asia. These are critical effects that should be—but have not been—thoroughly contemplated by the U.S. government prior to intervening in the efficient operation of U.S. telecommunications markets.

Congress, the FCC, and other governmental entities would benefit from consultation with the FTC in the short and long terms. The FTC is uniquely positioned to offer expertise on the likely effects of regulation on marketplace behavior and consumer welfare. Given the high likelihood of further attempts to regulate competitive forces in U.S. telecommunications markets, a hearing to discuss: 1.) how the undermined competition resulting from excluding Huawei and other Chinese companies would affect the American economy; and 2.) how the agency can fulfill its competition advocacy role by ensuring that these effects are appropriately accounted for in legislative and administrative decision-making that affects telecommunications equipment markets, is of critical importance.

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<sup>18</sup> See, e.g., Huawei FCC Comments 86-91, *supra* note 9; Huawei FCC Reply Comments 61-64, *supra* note 9.

#### IV. REGULATORY INTERVENTION IN MARKETS OFTEN HAS DIRECT ANTICOMPETITIVE EFFECTS

As recently as last year, the FTC acknowledged the undue burdens on competition that arise out of regulatory intervention in the marketplace, and that even if laws and regulations are well-intentioned, they may not always yield more benefits than harms. For example, regulations that inhibit entry into a market “may lead to higher prices, lower quality, and reduced consumer access to services and goods.”<sup>19</sup> “Moreover, public restraints on competition may sometimes prove particularly harmful and durable, but may not always be actionable under federal antitrust laws. Competition advocacy ... encourages federal and state policy makers to consider how existing and proposed regulations are likely to affect competition and consumers, as well as other important policy goals.”<sup>20</sup> As a result of the anticompetitive effects that regulation may have, the FTC encourages policymakers seeking to impose regulations that may have an anticompetitive effect to ask hard questions and consider alternative protections that may be able to accomplish “as much or more, while doing less harm.”<sup>21</sup>

Similarly, the current Assistant Attorney General for Antitrust at the Department of Justice (“DOJ”), Makan Delrahim, publicly echoed these sentiments in a speech earlier this year. Mr. Delrahim noted the anticompetitive effects and harm to consumers that arise from unduly burdensome occupational licensing, state regulation of car dealerships, and regulation of real estate transactions, including by driving up costs. He went on to note that, although there may be

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<sup>19</sup> See Prepared Statement of the Federal Trade Commission on Competition and Occupational Licensure, Before the Judiciary Committee Subcommittee on Regulatory Reform, Commercial and Antitrust Law, United States House of Representatives 2 (Sept. 12, 2017), [https://www.ftc.gov/system/files/documents/public\\_statements/1253073/house\\_testimony\\_licensing\\_and\\_rbi\\_act\\_sept\\_2017\\_vote.pdf](https://www.ftc.gov/system/files/documents/public_statements/1253073/house_testimony_licensing_and_rbi_act_sept_2017_vote.pdf).

<sup>20</sup> *Id.* at 10.

<sup>21</sup> *Id.* at 11-12.



legitimate policy reasons for a given regulation, “the market distorting aspects and anticompetitive effects these regulations have” should be evaluated to determine if they are justified.<sup>22</sup>

There are overwhelming examples from history that demonstrate that regulation and delaying the introduction of new goods, services, or competitors can be very costly to consumers and the economy. For example, in 1979 the National Commission for the Review of Antitrust Laws and Procedures evaluated a wide range of competition and antitrust issues, including the effect of state insurance regulations on competition. In delivering its report, the Commission opined that “it is not surprising that the evidence ... appears to demonstrate the regulatory schemes requiring prior state approval of rates have had an adverse effect on competition.”<sup>23</sup> The Commission noted that the DOJ’s findings that the benefits from competition, as compared to prior approval rate regulation, included less adherence to state insurance bureau advisory rates, rates that were as reasonable or lower than insurance rates in other states, and greater efficiency in distribution.<sup>24</sup> After evaluating technical and economic analyses, the Commission maintained its finding that open competition provides a better environment than a market environment of prior approval regulation.

The Merchant Marine Act of 1920 (i.e., the Jones Act) is another well-intentioned yet ultimately anticompetitive law that has had a demonstrable negative effect on the marketplace. This law requires the use of U.S.-built, owned, crewed, and registered ships on all domestic

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<sup>22</sup> Opening Remarks of Makan Delrahim, Assistant Attorney General United States Department of Justice, Antitrust Division, at the Antitrust Division’s Third Roundtable on Competition and Deregulation (May 31, 2018), <https://www.justice.gov/opa/speech/assistant-attorney-general-makan-delrahim-delivers-opening-remarks-antitrust-divisions>.

<sup>23</sup> See Report to President and Attorney General of the National Commission for the Review of Antitrust Laws and Procedures 239 (1979).

<sup>24</sup> *Id.* at 240.

voyages. Although intended to bolster America’s shipping industry, this law has denied U.S. businesses access to the best shipping, ultimately resulting in large losses for U.S. consumers.<sup>25</sup> Notwithstanding the Jones Act, U.S. shipbuilders have contracts and other outsourcing relationships with foreign firms that—despite the Jones Act’s emphasis on using U.S.-built ships—ultimately result in ships being assembled but not truly made in America.<sup>26</sup> Establishing the nationality of owners of the ships is also a challenge due to increasing ownership by legal entities such as corporations and trading on global stock markets resulting in globalized and ever-changing ownership. U.S. ships can also be substantially more expensive (with some estimates projecting that U.S. ships may be four-to-five times the cost of imported ships and potentially twice as expensive per day as compared to foreign-flagged vessels).<sup>27</sup> The reduction in competition for shipping services (i.e., by excluding foreign vessels) allows domestic firms to charge inflated rates as compared to foreign-flagged vessels and provides the shipper with control over shipping schedules and the types of ships that are available that otherwise would not be demanded by the market.<sup>28</sup> In addition to distortions in the shipping market, the Jones Act has also resulted in trade distortions in agricultural products. For example, with the costs to ship feed grain and crop fertilizers using Jones Act ships so high, farmers have sought alternative (i.e., non-American) sources of these critical agricultural inputs.<sup>29</sup>

Finally, the Interstate Commerce Commission (“ICC”) was historically reluctant to grant new common carrier certificates unless the existing carriers were physically incapable of

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<sup>25</sup> See Thomas Grennes, An Economic Analysis of the Jones Act, Mercatus Research, Mercatus Center at George Mason University (2017), <https://www.mercatus.org/system/files/mercatus-grennes-jones-act-v2.pdf>.

<sup>26</sup> *Id.* at 16-17.

<sup>27</sup> *Id.* at 21-22.

<sup>28</sup> *Id.* at 25.

<sup>29</sup> *Id.* at 30.

handling the traffic that a new applicant proposed to carry. Ultimately, however, this type of regulation resulted in inflated rates of return for existing carriers and overly high market values of ICC certificates and permits, all of which ultimately contributed to inflated motor carrier rates.<sup>30</sup>

Regulation in the telecommunications industry has led to similar anticompetitive effects. The most striking example of anticompetitive effects arising out of well-intended regulatory choices involves AT&T. The U.S. government-regulated AT&T was a monopoly telecommunications provider for most of the twentieth century. Although there may have been some benefits from providing AT&T with a regulatory monopoly at some point, having only one provider in the marketplace ultimately resulted in suppressed competition for decades, leading to the breakup of AT&T's monopoly in the 1980s and a shift toward deregulation and competitive markets with the adoption of the Telecommunications Act of 1996. Some of the harms that resulted from providing a regulatory monopoly to AT&T included AT&T's reluctance to permit non-AT&T telephones to connect to its telephone system—a competitive barrier upheld by the FCC yet reversed by the D.C. Circuit in the *Hush-A-Phone* decision<sup>31</sup>—and declining to invest in fiber-optics to replace its legacy copper telephone lines until forced to do so as a result of competitive pressure from start-ups (i.e., MCI and Sprint).<sup>32</sup> Deregulation of AT&T ultimately resulted in more innovation and increased investment in telecommunications infrastructure.

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<sup>30</sup> Report to President and Attorney General of the National Commission for the Review of Antitrust Laws and Procedures 204-205 (1979).

<sup>31</sup> See *Hush-A-Phone Corp. v. United States*, 238 F.2d 266 (D.C. Cir. 1956).

<sup>32</sup> See *Telecommunications: The Role of the Department of Justice: Hearing Before the H. Comm. on the Judiciary*, 104th Cong. 125-26 (1995) (statement of Timothy J. Regan, Division Vice President and Director of Public Policy, Corning, Inc.).

These are just a few examples of regulations that—although well-intended—have proven to be anticompetitive in practice, ultimately resulting in harm to consumers.

**V. REGULATIONS THAT INHIBIT COMPETITION FROM HUAWEI DIRECTLY HARM CONSUMERS, WHO WILL FACE HIGHER PRICES, LOWER QUALITY, REDUCED INVESTMENT, AND REDUCED INCENTIVES TO INNOVATE**

Although Huawei is a relatively small player in the U.S. today in terms of market share, due in no small part to the regulatory hurdles it has faced, it is capable of serving (and indeed already has served), as an important competitive force. As the economist Allan Shampine sets out in comments accompanying this submission, U.S. telecommunications equipment markets are significantly more concentrated than many ex-U.S. markets, with a few firms accounting for the vast majority of sales.<sup>33</sup> Dr. Shampine finds further that Huawei, despite having a small market share, is able to provide important competitive benefits to U.S. consumers when it is in a position to serve as a credible competitor.<sup>34</sup> If allowed to compete more freely, Huawei’s impact on competition in U.S. markets would undoubtedly increase, to the benefit of consumers. Conversely, if regulatory intervention prevents Huawei from competing effectively, consumers will be denied these benefits.

**A. Huawei participates in concentrated markets in the United States, which would become even more concentrated by the elimination of certain competitors.**

The U.S. telecommunications industry is distinct from the global telecommunications industry in that many of its segments are more highly concentrated than outside the U.S. Nearly every U.S. segment qualifies as “Highly Concentrated” on the Herfindahl-Hirschman Index

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<sup>33</sup> Comments of Allan L. Shampine, Ph.D. on Competition and Consumer Protection in the 21st Century Hearings, Project Number P181201 ¶¶ 7-13, Aug. 20, 2018 [hereinafter Shampine].

<sup>34</sup> Shampine, *supra* note 33, at ¶¶ 20-24.

(“HHI”), while globally the levels of concentration are significantly lower.<sup>35</sup> The DOJ and FTC have stated that, when there are only a few, large competitors in a market (i.e., a market is highly concentrated), then “the elimination of a competitor is presumed to increase market power of the remaining firms, resulting in higher prices or other harm to consumers.”<sup>36</sup> The following sections of these comments examine three specific segments of the U.S. telecommunications industry (telecommunications infrastructure, high-end smartphones, and network technology products for enterprise consumers) and reveal that excluding Huawei as a competitor from these segments would only serve to increase concentration and harm U.S. consumers.

**B. Eliminating Huawei as a supplier of telecommunications infrastructure equipment would deprive U.S. consumers of significant benefits.**

Huawei is a leading global supplier of telecommunications equipment, including wireless local area networks, passive optical networking, RAN infrastructure, DSL equipment, and backbone WDM equipment.<sup>37</sup> Globally in 2017, Huawei owned a 28% share of the segment in 2017, followed by 27% for Ericsson, 23 % for Nokia, 13% for ZTE, and 3% for Samsung.<sup>38</sup> Despite Huawei’s strong telecommunications infrastructure offerings, the segment in the U.S. is dominated by three firms (Nokia, Ericsson, and Samsung) that control nearly 91% of sales.<sup>39</sup> If allowed to compete freely in the telecommunications infrastructure segment, Huawei could act

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<sup>35</sup> Shampine, *supra* note 33, at ¶¶ 8-9; Stéphane Téral, *Global mobile infrastructure market down 14 percent from a year ago*, IHS, Mar. 13, 2018, <https://technology.ihs.com/600864/global-mobile-infrastructure-market-down-14-percent-from-a-year-ago>.

<sup>36</sup> Shampine, *supra* note 33 at ¶ 5; U.S. Department of Justice and the Federal Trade Commission, *Horizontal Merger Guidelines*, Aug. 19, 2010, <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010>, §§1, 2.1, 5.3, 6.

<sup>37</sup> Shampine, *supra* note 33 at ¶ 18; Huawei Investment & Holding Co, Ltd. 2017 Annual Report, [http://www-file.huawei.com/-/media/CORPORATE/PDF/annual-report/annual\\_report2017\\_en.pdf?la=en](http://www-file.huawei.com/-/media/CORPORATE/PDF/annual-report/annual_report2017_en.pdf?la=en).

<sup>38</sup> Shampine, *supra* note 33 at ¶ 9; Stéphane Téral, *Global mobile infrastructure market down 14 percent from a year ago*, IHS, Mar. 13, 2018, <https://technology.ihs.com/600864/global-mobile-infrastructure-market-down-14-percent-from-a-year-ago>.

<sup>39</sup> Shampine, *supra* note 33 at ¶ 8.

as a meaningful constraint on Nokia, Ericsson, and Samsung, offering numerous benefits particularly to U.S. consumers who have a need for “one-stop shopping” for telecommunications infrastructure products that Huawei is able to provide.

**1. Huawei is an innovative and significant competitor in telecommunications infrastructure worldwide.**

Huawei has established itself as a leader in innovation. In 2017, Huawei had 32% of global RAN sales, followed by Ericsson (30%) and Nokia (25%).<sup>40</sup> GlobalData ranked Huawei’s Mobile Access solutions as “Very Strong” or “Leader” in all seven of the ranked aspects in its Competitive Index. It ranked Huawei’s 2G, 3G, and LTE RAN product portfolios as “Leaders” in the market, citing “a broad radio unit portfolio and spectrum support” and “advanced antenna solutions.”<sup>41</sup> Notably, Huawei is set to become the first company in the world offering both infrastructure and terminal technologies for 5G, with Memorandums of Understanding to trial 5G equipment with several carriers in the United Kingdom, Germany, France, and Canada.<sup>42</sup>

Huawei’s relatively large global share of the telecommunications infrastructure segment is also evidence that it is a credible supplier for U.S. carriers, as many carriers globally have shown a preference for Huawei’s products over alternatives offered by other firms. European

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<sup>40</sup> Shampine, *supra* note 33 at ¶ 16; Eric Auchard & Sijia Jiang, *China’s Huawei set to lead global charge to 5G networks*, Reuters, Feb. 23, 2018, <https://www.reuters.com/article/us-telecoms-5g-china/chinas-huawei-set-to-lead-global-charge-to-5g-networks-idUSKCN1G70MV>.

<sup>41</sup> Shampine, *supra* note 33 at ¶ 16; Ed Gubbins, *Huawei – Mobile Access*, GlobalData, Nov. 15, 2017.

<sup>42</sup> Shampine, *supra* note 33 at ¶ 17; Eric Auchard & Sijia Jiang, *China’s Huawei set to lead global charge to 5G networks*, REUTERS, Feb. 23, 2018, <https://www.reuters.com/article/us-telecoms-5g-china/chinas-huawei-set-to-lead-global-charge-to-5g-networks-idUSKCN1G70MV>; Light Reading, *Huawei Unveils 5G-Ready Base Station, New Massive MIMO AAU*, Nov. 20, 2017, <https://www.lightreading.com/mobile/5g/huawei-unveils-5g-ready-base-station-new-massive-mimo-aau/d/d-id/738338>; Arjun Kharpal, *Mobile World Congress – Huawei unveils its first 5G chip in a challenge to Qualcomm and Intel*, CNBC, Feb. 25, 2018, <https://www.cnbc.com/2018/02/25/huawei-unveils-5g-chipset-at-mobile-world-congress.html>.

countries have frequently relied on Huawei to modernize their wireless networks,<sup>43</sup> and the European Commission recognized Huawei as an alternative supplier for 4G and 5G equipment in its evaluation of the Alcatel-Lucent merger.<sup>44</sup> Similarly, Huawei is a credible alternative for U.S. carriers, offering high-quality, innovative products and attentive service, and its presence would effectively trim down the inflated price level for telecommunication equipment products caused by the current lack of competition in the U.S.

**2. Competition from Huawei in the U.S. telecommunications infrastructure market would decrease market concentration and benefit consumers.**

If allowed to compete freely in the U.S., Huawei is poised to offer a much-needed constraint on current suppliers of telecommunications infrastructure equipment in the U.S. As noted above, Nokia, Ericsson, and Samsung control 91% of U.S. wireless infrastructure sales. Worldwide, mobile infrastructure sales are substantially less concentrated than in the U.S., in large part due to Huawei's credible presence in the market, and there is evidence that this has produced lower prices and more innovation. This discrepancy is apparent in HHI figures for telecommunications infrastructure markets that are substantially higher in the U.S. as compared to Europe, signifying that the U.S. market is more highly concentrated. In the U.S., the HHI for wireless sales are over 3,400, while the global HHI is 2,750.<sup>45</sup>

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<sup>43</sup> Shampine, *supra* note 33 at ¶ 17 ; TeleGeography, *Huawei completes modernisation of TDC network*, June 3, 2015, <https://www.telegeography.com/products/commsupdate/articles/2015/06/03/huawei-completes-modernisation-of-tdc-network/>. TDC was originally the government-owned incumbent operator in Denmark, but the last state-owned shares were sold in 1998. Anders Henten, *Telecoms in Denmark: Investment, Performance and Regulation*, in *Stimulating Investment in Network Development: Roles for Regulators*, A.K. Mahan and W.H. Melody (eds.), World Dialogue on Regulation for Network Economics 330 (2005).

<sup>44</sup> Shampine, *supra* note 33 at ¶ 17; European Commission, Case No COMP/M.7632 – *Nokia / Alcatel-Lucent*, Regulation (EC) No 139/2004 Merger Procedure, Article 6(1)(b) Non-Opposition ¶ 85, July 24, 2015, doc. no. 32015M7632, [http://ec.europa.eu/competition/mergers/cases/decisions/m7632\\_788\\_2.pdf](http://ec.europa.eu/competition/mergers/cases/decisions/m7632_788_2.pdf).

<sup>45</sup> Shampine, *supra* note 33 at ¶ 9.

Beyond decreasing the market concentration and bringing it more in line with the global market, Huawei's presence in the U.S. telecommunications infrastructure segment would generate important benefits for consumers. First, Huawei has delivered advanced technology to the U.S. market. For example, its 4T4R Single RAN products have helped U.S. carriers improve their service area coverage by 30%.<sup>46</sup> A number of customers have chosen Huawei's products because they are technically superior to the current U.S. offerings.<sup>47</sup> Furthermore, Huawei is a market leader in R&D, having invested roughly \$62 billion between 2012 and 2016 and significantly outpacing Nokia and Ericsson during that period, and its efforts will generate benefits for U.S. customers.<sup>48</sup>

Second, while Huawei's U.S. presence has been limited to date, there is evidence that when Huawei has been permitted to bid on requests for proposals in the U.S., its participation has resulted in lower prices for carriers and consumers. For example, the Chief Technical Officer of the Canadian carrier Telus recently stated that "[o]ne of the great things about Huawei being in the market is they have dropped prices by 15% at least."<sup>49</sup> Additionally, the European

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<sup>46</sup> Huawei FCC Comments, *supra* note 9.

<sup>47</sup> Shampine, *supra* note 33 at ¶ 24; Declaration of Todd Houseman, United Telephone Association, Inc., attached to CCA Comments, WC Docket No. 18-89 ¶ 3, June 1, 2018, [https://ecfsapi.fcc.gov/file/1060139338545/CCA%20Comments%20on%20FCC%20Communications%20Supply%20Chain%20NPRM%20\(060118\).PDF](https://ecfsapi.fcc.gov/file/1060139338545/CCA%20Comments%20on%20FCC%20Communications%20Supply%20Chain%20NPRM%20(060118).PDF); Declaration of Eric Woody, Union Telephone Company, attached to CCA Comments, WC Docket No. 18-89 ¶¶ 3-5, June 1, 2018, [https://ecfsapi.fcc.gov/file/1060139338545/CCA%20Comments%20on%20FCC%20Communications%20Supply%20Chain%20NPRM%20\(060118\).PDF](https://ecfsapi.fcc.gov/file/1060139338545/CCA%20Comments%20on%20FCC%20Communications%20Supply%20Chain%20NPRM%20(060118).PDF).

<sup>48</sup> Shampine, *supra* note 33 at ¶ 15.

<sup>49</sup> Shampine, *supra* note 33 at ¶ 13; Iain Morris, *Telus CTO: NFV Burden May Cripple Telcos*, LIGHTREADING, May 14, 2018, [https://www.lightreading.com/carrier-sdn/nfv-\(network-functions-virtualization\)/telus-cto-nfv-burden-may-cripple-telcos/d/d-id/743076](https://www.lightreading.com/carrier-sdn/nfv-(network-functions-virtualization)/telus-cto-nfv-burden-may-cripple-telcos/d/d-id/743076).



Commission has noted that Huawei's bidding on U.S. contracts has played a role in aiding the negotiations of U.S. carriers to obtain better terms from Ericsson and Alcatel-Lucent.<sup>50</sup>

Third, where it does have a U.S. presence, Huawei has already demonstrated strong customer service. For example, NE Colorado Cellular states that roughly 80% of equipment in its network comes from Huawei, chosen because it was the most cost-effective option and because of Huawei's customer service, and that prohibiting Huawei equipment and services would require NE Colorado Cellular to "rip and replace" much of its network at a cost of more than \$400 million.<sup>51</sup> Similarly, Union Telephone Company indicated that Huawei was the only vendor to respond to its request for proposal after the previous vendor was found to be unsatisfactory, and that Huawei is highly cost-effective and provides excellent customer service.<sup>52</sup> The Wall Street Journal reports that "many regional American providers of wireless, TV and internet services have flocked to Huawei, attracted by what they say are Huawei's cheaper prices, quality products and attentive customer service."<sup>53</sup>

Finally, Huawei is one of only a few firms that offers a broad portfolio of telecommunications equipment and services. The Gartner Group's analysis of LTE network

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<sup>50</sup> Shampine, *supra* note 33 at ¶ 21; Kevin Fitchard, *Why the US needs Huawei more than Huawei needs the US*, GIGAOM, May 31, 2013, <https://gigaom.com/2013/05/31/why-the-us-needs-huawei-more-than-huawei-needs-the-us/>.

<sup>51</sup> Shampine, *supra* note 33 at ¶ 24; Declaration of Frank DiRico, NE Colorado Cellular, attached to CCA Comments, WC Docket No. 18-89 ¶¶ 3-4, June 1, 2018, [https://ecfsapi.fcc.gov/file/1060139338545/CCA%20Comments%20on%20FCC%20Communications%20Supply%20Chain%20NPRM%20\(060118\).PDF](https://ecfsapi.fcc.gov/file/1060139338545/CCA%20Comments%20on%20FCC%20Communications%20Supply%20Chain%20NPRM%20(060118).PDF).

<sup>52</sup> Shampine, *supra* note 33 at ¶ 51; Declaration of Eric Woody, Union Telephone Company, attached to CCA Comments, WC Docket No. 18-89 ¶¶ 3-5, June 1, 2018, [https://ecfsapi.fcc.gov/file/1060139338545/CCA%20Comments%20on%20FCC%20Communications%20Supply%20Chain%20NPRM%20\(060118\).PDF](https://ecfsapi.fcc.gov/file/1060139338545/CCA%20Comments%20on%20FCC%20Communications%20Supply%20Chain%20NPRM%20(060118).PDF).

<sup>53</sup> Shampine, *supra* note 33 at ¶ 23; Drew Fitzgerald and Stu Woo, *In U.S. Brawl With Huawei, Rural Cable Firms Are an Unlikely Loser*, THE WALL STREET JOURNAL, Mar. 27, 2018, <https://www.wsj.com/articles/caught-between-two-superpowers-the-small-town-cable-guy-1522152000>.

infrastructure lists four firms as having a combination of ability to execute and completeness of vision – Ericsson, Nokia, Huawei and ZTE.<sup>54</sup> The ability to offer a complete portfolio of services may be important to certain customers.

Conversely, Huawei’s exclusion from telecommunications infrastructure equipment markets would substantially increase prices for U.S. carriers and consumers, while significantly hampering investment and innovation in telecommunications infrastructure, including investment in 5G. Thus, Huawei should be allowed to offer its telecommunications infrastructure products in the U.S. in order to decrease concentration, increase competition, and benefit consumers.

**C. Eliminating Huawei as a supplier of high-end smartphones would deprive U.S. consumers of significant benefits.**

Huawei is also a global supplier of smartphones, offering low-end, mid-range, and high-end products compatible with 3G and 4G technologies.<sup>55</sup> Unlike low-end and mid-range smartphones, high-end smartphones incorporate more advanced technology, such as faster processors, longer battery life, and better screen-to-body ratio, and as a result, cost more than low-end and mid-range smartphones.<sup>56</sup> In the U.S., high-end smartphones accounted for approximately half of all smartphone sales in 2017.<sup>57</sup> Despite Huawei’s strong high-end smartphone offerings, the high-end smartphone segment in the U.S. is nearly a duopoly with

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<sup>54</sup> Shampine, *supra* note 33 at ¶ 19; Kosei Takiishi, Sylvain Fabre, Peter Liu, Frank Marsala & Jessica Ekholm, *Magic Quadrant for LTE Network Infrastructure*, GARTNER, July 31, 2017, pp. 2-3.

<sup>55</sup> Huawei also manufactures laptops, tablets, and other smart mobile devices, such as watches, but smartphones are the core focus of Huawei’s consumer business.

<sup>56</sup> IDC defines high-end and ultra-high-end smartphones as smartphones priced \$400 or higher. *See* IDC, IDC Worldwide Quarterly Mobile Phone Tracker. The term “high-end,” as used in this comment, refers to smartphones priced \$400 or higher.

<sup>57</sup> IDC, *supra* note 56. In contrast, high-end smartphones accounted for only approximately 25% of global smartphone sales in 2017.

only two primary suppliers: Apple and Samsung. If allowed to compete freely in the high-end smartphone segment, Huawei could act as a meaningful constraint on Apple and Samsung, offering numerous benefits to U.S. consumers who have shown a clear preference for high-end smartphones over other offerings.

**1. Huawei is an innovative and significant competitor in high-end smartphones worldwide.**

Huawei launched its first smartphone for Western countries in 2010. Since then, it has become a credible alternative to Apple and Samsung as a supplier of smartphones, including high-end smartphones. It offers high-end smartphones with comparable or superior technical features at competitive prices, for which many consumers globally have shown a preference.

The average life of a high-end smartphone is short, primarily as a result of rapidly changing technology, so Huawei releases two new series of smartphones each year with new and improved features. Huawei's high-end smartphones incorporate technologies and features superior to or on par with Apple's and Samsung's high-end smartphones. For example, Huawei's P20 Pro smartphone is the only smartphone to include a triple-lens camera, which offers superior imaging quality, and Huawei's Mate 10 Pro is the first smartphone with an embedded artificial intelligence ("AI") chipset, offering consumers innovative and unique AI capabilities.<sup>58</sup> Moreover, the prices of both of these smartphones, and the rest of Huawei's smartphone portfolio, are competitive with Apple's and Samsung's comparable offerings.<sup>59</sup>

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<sup>58</sup> See, e.g., Corinne Reichert, *Huawei uses Mate 10 Pro AI to control driverless car*, ZDNET, Feb. 22, 2018, <https://www.zdnet.com/article/huawei-uses-mate-10-pro-ai-to-control-driverless-car/>; TechRadar Pro, *EE, Huawei and Three win big at the Mobile Industry Awards 2018*, TECHRADAR.PRO, June 8, 2018, <https://www.techradar.com/news/ee-huawei-and-three-win-big-at-the-mobile-industry-awards-2018>; Liam Tung, *Apple iPhone toppled: Huawei takes second spot in global sales for first time*, ZDNET, Sep. 7, 2017, <https://www.zdnet.com/article/apple-iphone-toppled-huawei-takes-second-spot-in-global-sales-for-first-time/>.

<sup>59</sup> IDC, *supra* note 56.

Huawei has a history of significant investment in R&D related to smartphones, and Huawei has positioned itself as a leader in smartphone technology. The focus of Huawei's R&D related to smartphones has been AI technology and camera performance, both of which will be important drivers of high-end smartphone sales over the next five years. Other drivers of high-end smartphone sales will be new handset forms, such as foldable handsets, and smartphones compatible with 5G technology. Huawei is a leader in the 5G space, and in February 2018, it unveiled the world's first commercialized 5G chipset, which will allow mobile devices to access 5G speeds.<sup>60</sup>

Huawei's strong smartphone offerings has led to commercial success worldwide. In 2017, Huawei was the third largest supplier of high-end smartphones outside the U.S., accounting for approximately 7% of high-end smartphone sales.<sup>61</sup> In the second quarter of 2018, Huawei surpassed Apple as the second largest global supplier of smartphones, and its share of high-end smartphone sales outside the U.S. jumped to 15%.<sup>62</sup> Huawei has accomplished this in less than 10 years, despite having virtually no presence in the U.S.

**2. If allowed to compete freely in the U.S., Huawei is poised to offer a much-needed constraint on the only two suppliers of high-end smartphones in the U.S.**

In 2017, Apple and Samsung dominated the high-end smartphone segment in the U.S., accounting for over 90% of high-end smartphone sales.<sup>63</sup> As a result, sales of high-end

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<sup>60</sup> Chris Kelly, *MWC 2018 - Huawei launches world's first commercialised 5G chip set*, TOTAL TELECOM, Feb. 25, 2018, <https://www.totaltele.com/499418/MWC-2018-Huawei-launches-worlds-first-commercialised-5G-chip-set>.

<sup>61</sup> IDC, *supra* note 56.

<sup>62</sup> Dan Strumpf, *Bigger Sales Than Apple? China's Huawei Doesn't Need the U.S.*, THE WALL STREET JOURNAL, Aug. 3, 2018, <https://www.wsj.com/articles/bigger-sales-than-apple-chinas-huawei-doesnt-need-the-u-s-1533296175>.

<sup>63</sup> IDC, *supra* note 56.

smartphones in the U.S. in 2017 were very highly concentrated, as evidenced by a HHI above 5,500.<sup>64</sup> In contrast, sales of high-end smartphones were much less concentrated outside the U.S., largely due to the presence of Huawei as a credible third supplier of high-end smartphones. Despite Huawei’s price-competitive and technologically superior high-end smartphone offerings, Huawei has not had the opportunity to reach U.S. consumers through U.S. carriers, who sell more than 90% of all smartphones to U.S. consumers, based on unfounded concerns about national security in the U.S.

Apple’s and Samsung’s high-end smartphone sales are smaller outside the U.S. In 2017, Apple and Samsung accounted for 55% and 21% of such sales, respectively.<sup>65</sup> This is in large part due to Huawei’s 7% share in this segment.<sup>66</sup> Accordingly, the HHI for high-end smartphone sales outside the U.S. was almost 2,000 points lower than the HHI in the U.S. in 2017. Moreover, as Huawei continues to grow, the HHI for high-end smartphone sales outside the U.S. has fallen in Q2 2018 to less than 2,500, indicating this segment is now “moderately” as opposed to “highly” concentrated.<sup>67</sup> Conversely, the HHI for high-end smartphone sales in the U.S. increased in Q2 2018 by more than 100 points.<sup>68</sup>

Entry by Huawei as a third supplier of high-end smartphones would result in less concentration in the U.S., consistent with the positive effect Huawei is having on concentration of high-end smartphone sales outside the U.S. This is of critical importance to U.S. consumers, who currently are denied all of the consumer benefits associated with less concentration—more

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<sup>64</sup> See Shampine, *supra* note 33, Table 1.

<sup>65</sup> IDC, *supra* note 56.

<sup>66</sup> IDC, *supra* note 56.

<sup>67</sup> See Shampine, *supra* note 33, Table 1; IDC, *supra* note 56; Horizontal Merger Guidelines, *supra* note 36.

<sup>68</sup> IDC, *supra* note 56.

choices, better customer service, competitive pricing, and higher incentives to innovate—which are already available to consumers outside the U.S.

Moreover, it is not necessary for Huawei to gain significant sales of high-end smartphones in order to benefit U.S. consumers. If Huawei were given the opportunity to capture just 7% of the U.S. market for high-end smartphones, consistent with its position outside the U.S. in 2017, it would deconcentrate high-end smartphone sales by more than 500 points in the U.S.<sup>69</sup> Additionally, although high-end smartphone sales would remain very concentrated with Huawei accounting for just 7% of sales, U.S. consumers would still benefit from having Huawei as a credible alternative during the bidding processes conducted by U.S. carriers, who are the primary distributors of smartphones in the U.S. The threat of Huawei as a possible third supplier of high-end smartphones would incentivize Apple and Samsung to offer lower prices, better customer service, and innovative technologies to maintain distribution through U.S. carriers.

Huawei’s possible exclusion from high-end smartphone sales in the U.S. as a result of government regulation would entrench the near duopoly enjoyed by Apple and Samsung in the high-end smartphones segment. As a result, U.S. consumers, who have shown a clear preference for high-end smartphones over other offerings, will be denied all of the benefits of more choice enjoyed by consumers outside the U.S.

**D. Eliminating Huawei as a supplier of network technology products for enterprise consumers would deprive U.S. enterprise consumers of significant benefits.**

Huawei is a global supplier of network technology products for enterprise consumers, including switches, routers, and wireless local area network (“WLAN”) products. Despite

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<sup>69</sup> This assumes Huawei would capture equal share from both Apple and Samsung.

Huawei's strong switch, router, and WLAN product offerings, Cisco is by far the largest supplier of these network technology products to U.S. enterprise consumers. If allowed to compete freely to supply these products, Huawei could act as a meaningful constraint on Cisco, offering numerous benefits to U.S. consumers.

**1. Huawei is an innovative and significant competitor in network technology products to enterprise consumers worldwide.**

Huawei is the only supplier of network technology products who can offer an end-to-end solution to enterprise consumers for their ICT infrastructures, including switch, router, WLAN product, storage, server, and eLTE offerings. As a result, 197 Fortune Global 500 companies—45 of which are Fortune 100 companies—have chosen Huawei's network technology offerings for their digital transformation.<sup>70</sup>

In particular, Huawei's strong switch portfolio, including Layer 2 and Layer 3 switches, has had strong commercial success outside the U.S. due to its competitive pricing and technical features. A network switch enables communication between different networked devices. A Layer 2 switch processes and forwards data within one network, while a Layer 3 switch processes and forwards data between networks. Whether an enterprise customer requires a Layer 2 or Layer 3 switch depends on the size of the enterprise and the desired data speeds. Layer 3 switches can accommodate more users and allow for higher bandwidths and speeds, and thus cost more than Layer 2 switches. The majority of enterprise consumers require just a Layer 2 switch. Huawei sells more switches than any other network technology product in its portfolio,

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<sup>70</sup> Huawei Investment & Holding Co, Ltd. 2017 Annual Report, [http://www-file.huawei.com/-/media/CORPORATE/PDF/annual-report/annual\\_report2017\\_en.pdf?la=en](http://www-file.huawei.com/-/media/CORPORATE/PDF/annual-report/annual_report2017_en.pdf?la=en).

and in 2017, Huawei was the fourth largest supplier of Layer 2 switches outside the U.S. and the second largest supplier of Layer 3 switches outside the U.S.<sup>71</sup>

Huawei also has a strong portfolio of routers, which has achieved commercial success outside the U.S. due to competitive pricing and technical features. A router performs similar functions as a Layer 3 switch. However, a router processes and forwards data remotely, as opposed to locally, like a Layer 3 switch. Routers can also incorporate additional features including interfaces and protocols, which are not found in Layer 3 switches. As a result, routers often cost more than Layer 3 switches. Huawei sells low-end, mid-range, and high-end routers, which are differentiated by the bandwidths they support, positions in the networks, and cost. In 2017, Huawei was the second largest supplier of low-end routers and mid-range routers and the largest supplier of high-end routers outside the U.S.<sup>72</sup>

Huawei's portfolio of network technology products also includes a strong portfolio of indoor and outdoor WLAN products, including access controllers and access points, which have achieved commercial success outside the U.S. due to competitive pricing and technical features. Access controllers manage access points, which allow a wireless device to connect to a wired network. Access controllers also function as a switch for all wireless traffic, and consolidate management for an entire wireless network in one place. Access points may be located indoors or outdoors. Indoor access points are suitable for most enterprise consumers, but certain enterprise consumers, such as college campuses and stadiums, require more costly outdoor access points, which must have durable casing and be waterproof. In 2017, Huawei was the third

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<sup>71</sup> IDC, IDC Quarterly Ethernet Switch Tracker.

<sup>72</sup> IDC, IDC Quarterly Router Tracker.



largest supplier of indoor access points and the second largest supplier of access controllers and outdoor access points outside the U.S.<sup>73</sup>

**2. If allowed to compete freely in the U.S., Huawei is poised to offer a much-needed constraint on the only significant supplier of network technology products in the U.S.**

In 2017, Cisco dominated network technology product sales to U.S. enterprise consumers, accounting for over 50% of sales of most switches, routers, and WLAN products.<sup>74</sup> In contrast, Cisco’s shares of these products to enterprise consumers outside the U.S. were much smaller.

**Table 1: 2017 Cisco Revenue Shares by Network Technology Segment<sup>75</sup>**

<b>Segment</b>	<b>U.S. Revenue Share</b>	<b>Outside U.S. Revenue Share</b>
Layer 2 Switches	87%	46%
Layer 3 Switches	63%	47%
Low-end Routers	99%	64%
Mid-range Routers	97%	58%
High-end Routers	45%	30%
Access Controllers	74%	56%
Indoor Access Points	46%	36%
Outdoor Access Points	59%	35%

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<sup>73</sup> IDC, IDC Quarterly Wireless LAN Tracker.

<sup>74</sup> See IDC, *supra* note 71; IDC, *supra* note 72; IDC, *supra* note 73.

<sup>75</sup> *Id.*

As a result of Cisco’s dominance in the U.S., sales of network technology products to U.S. enterprise consumers were highly concentrated in 2017, as evidenced by HHIs in the U.S. well above 2,500. Additionally, 2017 sales of network technology products to enterprise consumers were much more highly concentrated in the U.S. than outside the U.S.

**Table 2: 2017 HHIs in Network Technology Segments<sup>76</sup>**

<b>Segment</b>	<b>U.S. HHI</b>	<b>Outside U.S. HHI</b>
Layer 2 Switches	7,653	2,371
Layer 3 Switches	4,161	2,610
Low-end Routers	9,718	4,811
Mid-range Routers	9,319	5,118
High-end Routers	3,812	3,542
Access Controllers	5,811	3,397
Indoor Access Points	2,671	1,710
Outdoor Access Points	3,824	1,579

Cisco’s lower shares of network technology product sales outside the U.S., and the corresponding lower HHIs, are in large part due to Huawei’s presence as a credible alternative supplier of network technology products to Cisco. To date, Huawei has only been given limited opportunities to supply network technology products in the U.S. based on unfounded concerns about national security in the U.S. Entry by Huawei as another credible supplier of these products, consistent with its position outside the U.S., would offer all of the consumer benefits associated with less concentration—more choices, better customer service, competitive pricing,

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<sup>76</sup> Shampine, *supra* note 33, Table 1.

and higher incentives to innovate—which are already available to enterprise consumers outside the U.S.

Moreover, Huawei does not need to gain significant sales of network technology products in order to benefit U.S. enterprise consumers. If Huawei were given the opportunity to capture just 5% of the U.S. markets for these products, it would deconcentrate sales of most network technology products by between 500 and 1,000 points in the U.S.<sup>77</sup> Additionally, even with such a small share, U.S. enterprise consumers would benefit from having Huawei as a credible alternative to Cisco. For example, Huawei recently bid to replace Cisco switches and routers used by a major university in the U.S. The Cisco hardware was outdated, and the maintenance costs were very high. Huawei offered to supply switches and routers with technical features superior to the outdated Cisco hardware at a competitive price. Huawei eventually lost the business to Cisco, who Huawei understands lowered their prices considerably upon learning about Huawei’s involvement in the bidding process. Further opportunities for Huawei to bid to supply network technology products to U.S. enterprise consumers could have similar results even if Huawei never obtains market shares that rival its shares abroad.

Huawei’s possible exclusion from network technology product sales in the U.S. as a result of government regulation would further entrench Cisco as the dominant supplier of these products to U.S. enterprise consumers. As a result, U.S. enterprise consumers will be denied all of the benefits of more choice enjoyed by consumers outside the U.S., including lower prices, better customer service, and higher incentives to innovate.

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<sup>77</sup> This assumes Huawei would capture 5% of Cisco’s share.

## **VI. THE ANTICOMPETITIVE EFFECTS OF GOVERNMENT INTERVENTION HAVE NOT BEEN PROPERLY WEIGHED**

As noted at the outset of these comments, ensuring that the United States' security interests are not compromised through the purchasing and use of telecommunications equipment and services is an appropriate and laudable goal. However, it is one that can be achieved without fully sacrificing the benefits to consumers and the nation from healthy competition. Regulators should certainly seek to minimize security risks, but whenever possible they should do so in a manner that minimizes harm to the free market system. Huawei submits that many of the concerns expressed about Chinese government influence have been overstated. As discussed above, there is no credible evidence that Huawei is under the influence of the Chinese state when it comes to global product development and sales of its products and services. Moreover, as discussed below, there are natural safeguards in place that help to ensure that no one firm or nation becomes dominant in the development of new technologies. In addition, simply eliminating certain firms from the marketplace also offers no guarantee of eliminating (or even substantially reducing) any perceived risks. And the U.S. government has equally effective yet less restrictive tools at its disposal to help ensure national security interests are maintained.

### **A. Concerns that Chinese suppliers will dominate the next generation of U.S. telecommunications networks have been overstated.**

One concern expressed about Huawei and other foreign telecommunication suppliers is that, if they are allowed to compete fully in domestic markets, the U.S. may become over-reliant upon telecommunications equipment and services provided by firms with ties to foreign governments. A more specific variation of this concern is that Chinese suppliers in particular may come to dominate next-generation 5G technology and the inevitable standards that will be set to ensure 5G equipment interoperates.

Given the current state of competition in U.S. telecommunications markets, the nature of the processes by which universal standards are adopted, and the government's ability to regulate short of eliminating an important competitive force, however, these concerns are significantly overstated.

First, in none of the U.S. markets in which it operates is Huawei anywhere close to dominant today. Rather, Huawei accounts for less than 1% of the U.S. sales of most of the telecommunications infrastructure equipment, handsets, and enterprise network products it sells in this country.<sup>78</sup> The company faces stiff competition from large entrenched players such as Nokia, Ericsson, Samsung, Apple, and Cisco, all of whom have substantially greater market shares in the markets in which they compete against Huawei. And in the development of 5G technology, while Huawei is an active and important participant, Qualcomm and others are equally strong. As AT&T recently stated: “[T]hanks to multi-billion dollar investments made by American companies, the work to launch 5G service in the United States is already well down the road.... We have no doubt that America will lead the 5G revolution.”<sup>79</sup> In short, Huawei is a very long way from what anyone would consider dominant.

Outside the U.S., where it faces far fewer hurdles to competition, Huawei is a significant, but not dominant player. For example, Huawei accounted for approximately

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<sup>78</sup> For example, according to IDC reports, Huawei accounts for less than 1% of U.S. sales of routers, Layer 2 & 3 switches, and Smartphones, while Ovum reports Huawei with less than 1% of backbone and metro wavelength-division multiplexing (WDM) equipment sold in the country. Dell'Oro assesses approximately 2% of the U.S. sales of RAN equipment sales to Huawei, while Ovum reports Huawei with approximately 6% of passive optical networking equipment sold in the U.S. In each segment, Huawei faces larger competitors with substantially higher shares.

<sup>79</sup> John D. McKinnon, Kate O’Keeffe and Ryan Knutson, *Trump Administration Weighs Building U.S. 5G Network to Counter China*, THE WALL STREET JOURNAL, Jan. 29, 2018, <https://www.wsj.com/articles/u-s-memo-urges-big-push-on-5g-wireless-technology-1517200319>.

11.8% of all global handset sales in Q1 2018, while its volume shares of handsets sold during the twelve months ending in March 2018 were approximately 8% for the UK, 12% in France, and 14% in Germany.<sup>80</sup> Meanwhile, the company garnered approximately a 28% share globally of network infrastructure equipment, including 32% of global RAN sales.<sup>81</sup> As discussed above, these shares show a credible and important competitor around the globe (including in several Western nations), but not one that is dominant.

Even with a strong focus on R&D, it is unlikely that Huawei or any other company will be in a position to dominate next-generation technology. According to the market intelligence firm IPLYtics, Huawei has an estimated 5G standard essential patent (“SEP”) portfolio share of approximately just 7.92%, while Qualcomm accounts for 8.6%, LG for 7.38%, Ericsson 6.74%, and Samsung 5.77%.<sup>82</sup> Indeed, the patent portfolios of the top 20 firms combined account for an estimated 65.21% share.<sup>83</sup> In other words, no single firm holds a dominant position with regard to 5G SEPs.

Moreover, the standard setting process itself guards against dominance, as standard setting bodies encourage the broad participation of many constituents and employ rules designed to ensure that the standards they adopt can be widely accessed. As one commentator recently explained:

[Standard Setting Organization] patent policies often require members to make available any proprietary technology to firms implementing the standard, often on ‘fair, reasonable and non-discriminatory’ (FRAND) terms, and less frequently on a royalty-free basis. Courts have enforced these obligations in civil suits. Moreover, both the Federal Trade

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<sup>80</sup> IDC, *supra* note 56.

<sup>81</sup> *See supra* section V.B.

<sup>82</sup> Tim Pohlmann, IAM, *Industry report - Who will be the technology leader for 5G? Part two*, July 18, 2018, <http://www.iam-media.com/industryreports/detail.aspx?g=0f9b82c5-b8a5-4354-80a4-dff99dedfcae>.

<sup>83</sup> *Id.*

Commission and the Department of Justice have sometimes stepped in to impose their interpretation of these rules.<sup>84</sup>

Thus, “it is difficult to see such [standard setting] bodies and their members quietly surrendering to the manipulation” of the process by one or a few firms. ... In an open international standard-setting process, which the United States has long pursued, this kind of control would be significantly more difficult to achieve.”<sup>85</sup>

Finally, the U.S. government has other options at its disposal short of blacklisting specific competitors to safeguard against foreign dominance. Most directly, the U.S. can use international trade policy to regulate the level of foreign imports allowed into the country, thus ensuring that foreign suppliers do not become the dominant providers of equipment used in the U.S. While direct government regulation of marketplace forces undoubtedly imposes costs on consumers, as these comments note elsewhere, traditional trade policy can nonetheless be used to protect U.S. interests where required.

The U.S. government also can further encourage, assist, and partner with existing U.S. suppliers, which already lead these markets and have every incentive to continue competing and developing new and improved products and services. And by promoting market-based competition in the development and supply of next-generation products and services, the government can help to ensure a robust marketplace in which firms of various nations compete vigorously to the benefit of consumers everywhere.

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<sup>84</sup> Eli Greenbaum, *5G, Standard-Setting, and National Security*, Harv. J. Nat. Security (July 3, 2018): <http://harvardnsj.org/2018/07/5g-standard-setting-and-national-security/>. Indeed, the rules of the Third Generation Partnership Project (“3GPP”), the international body overseeing much of the 5G standards development effort, reflect its emphasis on open and transparent processes that give voice to all participants. Such mechanisms can help to ensure that appropriate access to technology standards is available to all. Under such rules, while “Chinese companies may end up holding important patents, ... they will face serious legal and practical barriers to technological dominance in a way that could threaten national security.” *Id.*

<sup>85</sup> *Id.*

**B. Eliminating competitors with perceived ties to hostile governments today offers little actual protection.**

In today's global telecommunications marketplace, it is entirely artificial to distinguish competitors on the basis of their country of origin/formation, or of their headquarters location. The reality is that supply chains are affected by firms from all over the globe, and equipment or services ostensibly provided by one firm often incorporate technology or physical components of other firms from other parts of the world. As one major telecommunications equipment manufacturer has recently recognized, "essentially all major information technology and communications companies have global supply chains, many of which include sourcing of components from China and elsewhere."<sup>86</sup>

Moreover, firms that are incorporated or headquartered in one country quite often have substantial physical operations in another. For example, Nokia, Ericsson, Apple, Samsung and Qualcomm all have offices in China. Indeed, some of Nokia's equipment is made in China, with components purchased from Chinese companies, and Nokia has a joint venture with a Chinese government-owned entity.<sup>87</sup> Ericsson also has a joint venture with a Chinese government-owned entity, undertakes some manufacturing in China, and sources components from Chinese companies.<sup>88</sup> Thus, these and many other non-Chinese entities have at least some important ties to China and the Chinese government.

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<sup>86</sup> Letter from Brian Hendricks, Nokia Corporation to Marlene H. Dortch, Secretary, Federal Communications Commission (April 9, 2018) 1-2, <https://ecfsapi.fcc.gov/file/10409485606370/FCC%20Security%20NPRM%20Ex%20Parte%204-2018%20FINAL.pdf>.

<sup>87</sup> See, e.g., Declaration of John Suffolk, Exhibit A to Huawei FCC Comments, <https://ecfsapi.fcc.gov/file/1060161615708/%5BEXHIBIT%20A-N%5D%20Comments%20of%20Huawei%20Technologies%20Co.%2C%20Ltd.%20and%20Huawei%20Technologies%20USA%2C%20Inc.%20Docket%20WC%2018-89.pdf>.

<sup>88</sup> *Id.*



In addition, the ownership of private companies can and sometimes does change hands. While the companies noted above are not Chinese entities today, they may be acquired by a Chinese entity in the future. Thus, eliminating Huawei, ZTE, and others from the U.S. market today offers no guarantee that foreign companies will not participate in the development and provision of important telecommunications infrastructure equipment and services in the future.

Finally, there are many more practical risks than nationality associated with doing business with suppliers at home and around the globe. Any firm may come up short in providing safe and effective technology and equipment for any number reasons, including design flaws and execution problems. Over-reliance upon a single firm or small set of firms creates risks, especially where it encourages policies that may lead China and other governments to develop rival, rather than cooperative, network architectures. Huawei submits that it is in the best interest of the U.S. government, and of U.S. consumers, to encourage healthy marketplace competition in which the products and services of a variety of firms are offered, with purchasers able to pick and choose the solutions that best meet their needs. From a security standpoint, this can help to ensure that the U.S. does not place too many of its proverbial eggs in too few baskets.

**C. The government has ways to ensure that foreign manufactured equipment is safe and effective for use in U.S. networks.**

In addressing national security concerns, the government should be cognizant to avoid unnecessary harm to competition. Thus, where effective means exist to minimize security risk that are less restrictive of competition, they should be given full consideration. Here, a range of such alternatives exist.

First, there is broad consensus across the government and the private sector on the benefits of a risk-based approach to address cybersecurity, which does not necessitate the outright ban of any one supplier. For example, the NIST Cybersecurity Framework (the “NIST

Framework”)<sup>89</sup> is a well-recognized tool adopted by various countries’ governments and enterprises for assessing and addressing cybersecurity risk.<sup>90</sup> The most recent version of the NIST Framework includes a module specifically focused on managing supply chain risk. The NIST Framework lists several cybersecurity risk management activities, including “determining cybersecurity requirements for suppliers, enacting cybersecurity requirements through formal agreements (e.g., contracts), communicating to suppliers how those cybersecurity requirements will be verified and validated, verifying that cybersecurity requirements are met through a variety of assessment methodologies, and governing and managing [these] activities.”<sup>91</sup> Notably, the NIST Framework does not list blacklisting certain suppliers in the first instance.

Moreover, the FCC’s own Communications Security, Reliability and Interoperability Council (“CSRIC”) has recommended addressing cybersecurity issues in telecommunication networks through a risk-based approach, including through voluntary use of the NIST Framework.<sup>92</sup> Similar to the NIST Framework, the CSRIC does not include any recommendation to blacklist particular suppliers. In this instance, however, Huawei’s comments to the FCC in connection with the recent NPRM demonstrate that equipment sold by Huawei in the United States poses no threat to national security.<sup>93</sup>

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<sup>89</sup> NIST, Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1 (Apr. 16, 2018), <https://nvlpubs.nist.gov/nistpubs/CSWP/NIST.CSWP.04162018.pdf> [hereinafter NIST Framework].

<sup>90</sup> NIST, *Cybersecurity ‘Rosetta Stone’ Celebrates Two Years of Success*, Feb. 18, 2016, <https://www.nist.gov/news-events/news/2016/02/cybersecurity-rosetta-stone-celebrates-two-years-success>. Other countries have also endorsed the NIST Framework. See, e.g., Public Safety Canada, *Fundamentals of Cyber Security for Canada’s Critical Infrastructure Community* 5 (1st ed. 2016), <https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/2016-fndmntls-cybr-scrty-cmmnty/index-en.aspx>.

<sup>91</sup> NIST Framework, *supra* note 89, at 15-17.

<sup>92</sup> CSRIC, *Cybersecurity Risk Management and Best Practices Working Group 4: Final Report* 30-32 (Mar. 2015), [https://transition.fcc.gov/pshs/advisory/csric4/CSRIC\\_IV\\_WG4\\_Final\\_Report\\_031815.pdf](https://transition.fcc.gov/pshs/advisory/csric4/CSRIC_IV_WG4_Final_Report_031815.pdf).

<sup>93</sup> Huawei FCC Comments, *supra* note 9.

Finally, other countries, including the U.K., have developed an equipment testing regime, which is capable of finding both intentional and unintentional security vulnerabilities, to address cybersecurity risk.<sup>94</sup> Currently, in the U.K., there is a testing center, financed by Huawei, where 30 individuals with U.K. security clearances disassemble and test all Huawei equipment and software for security vulnerabilities. A board primarily made up of British intelligence officers and government officials oversees all of the work at the testing center. The U.S. could establish a testing center, or require suppliers wishing to do business in the U.S. to establish testing centers staffed and overseen by U.S. intelligence officers and government officials, to make sure telecommunications equipment used in the U.S. does not have security vulnerabilities.

These are just some of the ways that the U.S. government could minimize security risk while also promoting competition in highly concentrated telecommunications markets in the U.S. Inexplicably, neither the FCC nor Congress, considered any of these less-restrictive alternatives to the proposed FCC regulation and National Defense Authorization Act for Fiscal Year 2019. Failure to do so will unnecessarily deny U.S. consumers all of the benefits of more choice.

## **VII. CONCLUSION**

The occasion of the FTC's hearings on competition and consumer protection in the 21st century provide an opportunity for the FTC to address impending unreasonable restrictions to competition and harm to consumers in the telecommunications industry. Given its longstanding history as an advocate of competition, the FTC is uniquely positioned to help prevent proposed restrictive regulations that would unnecessarily limit consumer choice and create market inefficiencies.

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<sup>94</sup> See Comments of WTA – Advocates for Rural Broadband, In the Matter of Protecting Against National Security Threats to the Communications Supply Chain Through FCC Programs 7, FCC 18-42, WC Docket No. 18-89, June 1, 2018, <https://ecfsapi.fcc.gov/file/106011863609998/filing.supplychain.comments.FINAL.06012018.pdf>.

Here, there is a strong need for the FTC to provide Congress and the FCC with its expert economic analysis of the telecommunications industry, as well as of the actual risk and scope of perceived harm to U.S. interests, both now and on an ongoing basis, so that American national security and economic policy can be reviewed and adjusted with the best expert input from all agencies. Huawei requests that the FTC offer to brief the FCC and appropriate Congressional Committees on these topics. The agency should also work with the DOJ to help ensure competitive effects are appropriately weighed as part of any inter-agency review of proposed actions by the government. As the FTC pivots towards the 21st century, it is imperative that it prioritize achieving its mission through collaboration with other agencies and law enforcement partners to minimize the negative effect on competition, and thereby harm to consumers, caused by government regulation that is not narrowly tailored to achieve its legitimate objectives in the least restrictive way. Failure to do so will result in higher prices, lower-quality goods and services, reduced investment in the U.S., and reduced incentives to innovate. Such negative consequences will isolate the United States and cause it to fall behind other developed countries in important industries like telecommunications.

Huawei respectfully requests that the FTC consider the foregoing comments and provide it with an opportunity to discuss these issues in greater detail at the public hearings this fall.

**Comments of Allan L. Shampine, Ph.D.**  
**On “Competition and Consumer Protection in the 21st Century Hearings,**  
**Project Number P181201”**  
**August 20, 2018**

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## I. QUALIFICATIONS

1. My name is Allan L. Shampine. I am an Executive Vice-President of Compass Lexecon, an economic consulting firm. I received a B.S. in Economics and Systems Analysis *summa cum laude* from Southern Methodist University in 1991, an M.A. in Economics from the University of Chicago in 1993, and a Ph.D. in Economics from the University of Chicago in 1996. I have been with Compass Lexecon since 1996.

2. I specialize in applied microeconomic analysis with a particular focus on technological innovation. I am the editor of the book Down to the Wire: Studies in the Diffusion and Regulation of Telecommunications Technologies, a contributor to the Telecom Antitrust Handbook and The Cambridge Handbook of Technical Standardization Law, and have published a variety of articles on the economics of telecommunications and network industries, as well as patents, technology diffusion and antitrust issues and remedies. I am an editor of the American Bar Association journal *Antitrust Source*.

3. I have worked on telecommunications matters throughout my career, and have submitted testimony concerning mergers, antitrust concerns and regulation of telecommunication and broadband networks in multiple countries. I have previously provided economic evidence to the United States Federal Communications Commission, International Trade Commission, state public utility commissions, Federal Maritime Commission, United States district courts, European Commission, Korean Fair Trade Commission, Chinese National Development & Reform Commission, Info-Communications Development Authority of Singapore, and the Australian Competition & Consumer Commission. A copy of my curriculum vitae is included as Appendix A.

## II. DISCUSSIONS ABOUT ELIMINATING COMPETITORS FROM THE UNITED STATES SHOULD INCLUDE CONSIDERATION OF THE ECONOMIC COSTS

4. The Federal Communications Commission (“FCC”) and legislators are contemplating actions that would exclude firms like Huawei from competing for the business of carriers in the United States based on national security concerns. I have been asked by counsel for Huawei to discuss the potential economic costs of the proposed actions and the likely impact on

competition. I have submitted two declarations in the FCC's proceeding,<sup>1</sup> and have been asked to comment as part of the Federal Trade Commission's ("FTC") examination of competition in networked industries.

5. The U.S. Department of Justice ("DOJ") and FTC Horizontal Merger Guidelines state that when there are only a few, large competitors (i.e., a market is highly concentrated) then the elimination of a competitor is presumed to increase market power of the remaining firms, resulting in higher prices or other harm to consumers.<sup>2</sup> Mergers are nonetheless often permitted by regulators because of the expectation that they will produce offsetting benefits. Here, however, regulators and legislators are discussing the effective exclusion of one or more competitors by regulatory fiat without any offsetting merger efficiencies. Rather, the claimed benefits relate to national security. Given the likely competitive effects of such regulatory intervention, the costs and benefits should both be considered. That is, while determining whether there is a significant national security concern, it is also important to determine what the likely costs are of proposed policies to address that concern, and whether there are less costly ways to do so.

6. As an economist who has worked on telecommunications, competition and regulatory issues for more than 20 years, I am concerned when governments exclude significant competitors from their markets without due consideration of the economic burdens such exclusion can create. The FTC has significant experience at evaluating the costs and benefits of changes in the competitive landscape due to regulatory intervention or merger, and of crafting remedies to address potential concerns while still allowing creation of the benefits. The FTC's guidance could be of great benefit on this topic.

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1. Declaration of Allan L. Shampine, WC Docket No. 18-89, May 30, 2018, and Reply Declaration of Allan L. Shampine, WC Docket No. 18-89, June 29, 2018.

2. U.S. Department of Justice and the Federal Trade Commission, Horizontal Merger Guidelines, August 19, 2010, <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010>, §§1, 2.1, 5.3, 6.



### III. TELECOMMUNICATIONS INFRASTRUCTURE SALES IN MANY SEGMENTS ARE MORE CONCENTRATED IN THE U.S. THAN THE REST OF THE WORLD

7. People not familiar with the telecommunications industry may be surprised at how concentrated sales are in a variety of segments, including, in particular, wireless network infrastructure (often referred to as radio access network infrastructure, or “RAN”). I examine concentration in various segments of the industry using the Herfindahl-Hirschman Index (“HHI”), a standard measure of concentration which is simply the sum of the squared shares of the firms involved. This can run from close to zero (a large number of firms with very small shares of sales) to 10,000 (a single firm makes all sales). The Horizontal Merger Guidelines classify how concentrated markets are based on the HHI, and a market with an HHI above 2,500 is considered “Highly Concentrated” by the DOJ and FTC.<sup>3</sup>

8. As of 2015, market research firm Infonetics reported U.S. wireless infrastructure sales shares of 33 percent for Ericsson, 27 percent for Alcatel-Lucent, 20 percent for Nokia and 11 percent for Samsung.<sup>4</sup> Subsequently, Alcatel-Lucent and Nokia merged,<sup>5</sup> which yields shares of 47 percent for the merged Nokia, 33 percent for Ericsson, and 11 percent for Samsung – three firms becoming responsible for 91 percent of sales. The HHI for wireless infrastructure sales in the United States after the Alcatel-Lucent/Nokia merger based on these shares would be above 3,400.<sup>6</sup>

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3. U.S. Department of Justice and the Federal Trade Commission, Horizontal Merger Guidelines, August 19, 2010, <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010>, §5.3.

4. Simon Zekaria, “Merger of Nokia with Alcatel-Lucent Could Put Pressure on Prices,” Dow Jones Institutional News, April 14, 2015.

5. Nokia Press Release, “Nokia finalizes its acquisition of Alcatel-Lucent, ready to seize global connectivity opportunities,” November 2, 2016.

6.  $47^2 + 33^2 + 11^2 = 3,419$ . I treat the remaining 9 percent of sales as comprised of 1 percent firms, yielding a total HHI of  $3,419 + 9 = 3,428$ . The Chinese Ministry of Commerce (“MOFCOM”) and the European Commission (“EC”) both examined RAN products as a product market when evaluating the Alcatel-Lucent/Nokia transaction. PaRR, “MOFCOM conditionally clears Alcatel/Nokia deal with behavioral remedies (full translation),” October 19, 2015, §§3.1.A, 4. European Commission, Case No COMP/M.7632 – Nokia / Alcatel-Lucent, Regulation (EC) No 139/2004 Merger

9. Worldwide, wireless infrastructure sales are substantially less concentrated than in the United States, largely due to the presence of Huawei and ZTE. For example, the market research firm IHS reports mobile infrastructure shares in 2017 of 28 percent for Huawei, 27 percent for Ericsson, 23 percent for Nokia, 13 percent for ZTE, and 3 percent for Samsung.<sup>7</sup> These shares correspond to an HHI of below 2,300, substantially lower than that calculated above for the United States.<sup>8</sup> Similarly, the European Commission in evaluating the Alcatel-Lucent/Nokia transaction reported market shares for overall RAN equipment in Europe of 30-40 percent for the merged Nokia, 30-40 percent for Ericsson, 30-40 percent for Huawei, and 0-5 percent for both ZTE and Samsung.<sup>9</sup> Assuming 30 percent each for Nokia, Ericsson and Huawei, and 5 percent each for ZTE and Samsung yields an HHI of 2,750, again substantially lower than that calculated above for North America.<sup>10</sup>

10. With respect to the Alcatel-Lucent/Nokia merger, the European Commission apparently viewed the merger as going from six credible alternatives to five (or fewer, depending on the segment), noting that post-merger, Ericsson, Huawei, ZTE and Samsung would remain as credible alternatives for customers of RAN equipment. The European Commission specifically cited Huawei as one of the “main competitors ... already able to offer RAN, CNS and routing and switching solutions to [Nokia and Alcatel-Lucent’s] customers.”<sup>11</sup> China’s Ministry of Commerce applied similar logic, noting that for 4G LTE RAN equipment, for example, Huawei, ZTE and Ericsson “are all strong rivals, among which the first two companies’ respective market

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Procedure, Article 6(1)(b) Non-Opposition, July 24, 2015, document number 32015M7632, [http://ec.europa.eu/competition/mergers/cases/decisions/m7632\\_788\\_2.pdf](http://ec.europa.eu/competition/mergers/cases/decisions/m7632_788_2.pdf), (“EC Nokia/Alcatel Decision”), §§4.1, 5.2.

7. Stéphane Téral, “Global mobile infrastructure market down 14 percent from a year ago,” IHS, March 13, 2018, <https://technology.ihs.com/600864/global-mobile-infrastructure-market-down-14-percent-from-a-year-ago>.

8.  $28^2 + 27^2 + 23^2 + 13^2 + 3^2 + 6 = 2,226$ . As before, I assume the 6 percent of “Other” sales are made by 1 percent firms.

9. EC Nokia/Alcatel Decision, ¶ 82.

10.  $30^2 + 30^2 + 30^2 + 5^2 + 5^2 = 2,750$ .

11. EC Nokia/Alcatel Decision, ¶¶ 85, 210.

shares are larger than that of Nokia post-merger, so the competition dynamics will be maintained.”<sup>12</sup> The U.S. DOJ did not provide any public analysis of the transaction.

11. I have calculated HHIs for 2017 sales for a variety of industry segments for the United States and the rest of the world by analyzing data from various industry research firms.<sup>13</sup> Most of the segments have HHIs in the United States of greater than 2,500 and are generally higher in the United States than the rest of the world, often by more than 1,000. As discussed above, the difference in concentration is related in large part to the presence, or absence, of Huawei.

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12. PaRR, “MOFCOM conditionally clears Alcatel/Nokia deal with behavioral remedies (full translation),” October 19, 2015, §4.1.

13. IDC, Dell’Oro and Ovum.

**Table 1: 2017 HHIs by Type of Telecommunications Infrastructure**

Segment	USA	Rest of the World
Wireless LAN, Enterprise Class, Controller/Router/Switch Products	5,811	3,397
Digital Subscriber Line ("DSL") + Gfast <sup>1</sup>	3,511	3,009
<u>Router, Enterprise Deployment</u>		
Total of High-End, Low-End, and Mid-Range Products	8,010	4,643
High-End Products	3,812	3,542
Low-End Products	9,718	4,811
Mid-Range Products	9,319	5,118
<u>Radio Access Network ("RAN")<sup>1</sup></u>		
Total of GSM, CDMA, WCDMA, and LTE	4,493	2,563
GSM	5,992	3,197
CDMA	4,828	3,214
WCDMA	5,945	3,453
LTE	4,486	2,401
<u>Ethernet Switch</u>		
Total of Layer 2 and Layer 3	4,580	2,531
Layer 2	7,653	2,371
Layer 3	4,161	2,610
Passive Optical Networking ("PON") <sup>1</sup>	4,622	2,797
<u>Optical Networking<sup>1</sup></u>		
Total of Aggregation, Access Wavelength Division Multiplexing ("WDM"), Metro WDM, Backbone WDM, SLTE WDM, and Amplifiers/Wet plant	1,745	1,782
Backbone WDM	3,571	2,506
Metro WDM	1,937	2,033
<u>Handsets<sup>2</sup></u>		
Total of Ultra High-End, High-End, Mid-Range, Low-End, and Ultra Low-End Smartphone Classes	4,503	1,650
Ultra High-End and High-End Smartphone Classes	5,512	3,571
Mid-Range Smartphone Classes	1,957	1,401
Low-End and Ultra Low-End Smartphone Classes	2,255	954

Sources: Analyses of IDC, Dell'Oro and Ovum data.

Notes: Unless otherwise noted, HHIs are based on 2017 "vendor revenue" share, by company. Share of "Others" assumed to consist of firms with 1 percent shares.

1. HHIs for USA are calculated using North American revenues.
2. HHIs based on "value" shares.

12. A news report from GlobalData indicates that operators are attempting to address concentration in infrastructure vendors by combining equipment from multiple vendors within a single deployment, even though there are costs and inefficiencies associated with that strategy, and that U.S. operators are at the forefront because with “meaningful access to Huawei and ZTE blocked for political reasons – [U.S. operators] face the fewest options for RAN gear.”<sup>14</sup> The report also states that “[a] sign of how serious U.S. operators are on this topic came in the form of Samsung’s announcement during [Mobile World Congress, the telecom industry’s largest annual trade show,] that it had won its first contract to provide Verizon with LTE macrocell baseband and radio units. ... With the Samsung deployment, Verizon is demonstrating that pairing one vendor’s BBU with another vendor’s RU is possible but not that it is quick and easy (among the reasons it’s not: variability in each vendor’s implementation of the CPRI fronthaul technology that connects BBUs and RUs). This hurdle would be even higher in virtual RAN networks because different vendors may not have the same division of functions between baseband and radio.”<sup>15</sup> Additionally, operators have created groups “aimed at disaggregating the elements of the RAN to foster more flexible network architectures and a more competitive RAN vendor ecosystem. ... The creation of these groups is in part a reaction by operators to a consolidated RAN vendor landscape....”<sup>16</sup>

13. I discuss the potential benefits from increased competition from the presence of Huawei in more detail below. Various parties have indicated that having Huawei present and competing for business has benefited carriers through both lower prices and better service. For example, the Chief Technical Officer of the Canadian carrier Telus has stated that “One of the great things about Huawei being in the market is they have dropped prices by 15% at least. ... They forced the Ericssons and Nokias to follow suit.”<sup>17</sup> Similarly, a declaration by James Valley

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14. Ed Gubbins, “MWC18: The Radio Access Network Roundup – As 5G Dawns, Integrating Massive MIMO & Breaking Up the RAN,” GlobalData, March 7, 2018.

15. Ed Gubbins, “MWC18: The Radio Access Network Roundup – As 5G Dawns, Integrating Massive MIMO & Breaking Up the RAN,” GlobalData, March 7, 2018.

16. Ed Gubbins, “MWC18: The Radio Access Network Roundup – As 5G Dawns, Integrating Massive MIMO & Breaking Up the RAN,” GlobalData, March 7, 2018.

17. Iain Morris, “Telus CTO: NFV Burden May Cripple Telcos,” LightReading, May 14, 2018, [https://www.lightreading.com/carrier-sdn/nfv-\(network-functions-](https://www.lightreading.com/carrier-sdn/nfv-(network-functions-)

Telecommunications as part of the FCC proceedings indicated that Huawei's bid was 40 percent below competing offers.<sup>18</sup> My own analysis of concentration and prices for RAN equipment generally and for LTE base stations specifically (evolved NodeBs, or eNodeBs) is consistent with these conclusions. For example, industry concentration in LTE is higher in North America than elsewhere in the world, and average selling prices per LTE base station (whether overall, or by pico, micro and macro individually) are higher in North America than in other regions of the world.<sup>19</sup>

### III. HUAWEI IS A SIGNIFICANT COMPETITOR

14. Huawei is a large firm offering many different kinds of telecommunications infrastructure, equipment and services and competing throughout the world for carriers' business. It also has a history of significant investment in research and development.

#### A. Huawei has a history of significant investment in research and development

15. Over the past decade, Huawei has invested roughly \$62 billion in research and development, including \$34 billion between 2012 and 2016 and \$14 billion in 2017.<sup>20</sup> To put those figures into context, between 2012 and 2016 Nokia is reported to have spent roughly \$17 billion on research and development and Ericsson spent roughly \$23 billion. While Huawei and Nokia have been increasing their expenditures, Ericsson decreased its expenditures from 2014 to

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[virtualization\)/telus-cto-nfv-burden-may-cripple-telcos/d/d-id/743076.](#)

18. Declaration of James Groft, James Valley Telecommunications, attached to CCA Comments, WC Docket No. 18-89, June 1, 2018, ¶ 3.

19. Based on analysis of data from market research firms Infonetics, IHS, and Dell'Oro, news reports, and the European Commission and MOFCOM.

20. Huawei Investment & Holding Co, Ltd. 2017 Annual Report, [http://www-file.huawei.com/-/media/CORPORATE/PDF/annual-report/annual\\_report2017\\_en.pdf?la=en](http://www-file.huawei.com/-/media/CORPORATE/PDF/annual-report/annual_report2017_en.pdf?la=en), p. 50, reporting 2017 research and development expenditures of CNY89,690,000,000 and expenditures over the last decade of CNY394,000,000,000. Values above use exchange rate of 6.38 CNY per dollar, per Bloomberg, as of May 15, 2018. <https://www.bloomberg.com/quote/USDCNY:CUR>. Jamie Davies, "Ericsson is losing the R&D game and that needs to change," telecoms.com, June 5, 2017, <http://telecoms.com/482479/ericsson-is-losing-the-rd-game-and-that-needs-to-change/>.

2016. In 2015 and 2016, Huawei spent more than Ericsson and Nokia combined. See **Table 2** below.

**Table 2: Research & Development Investment  
(\$ Millions)<sup>21</sup>**

<b>Year</b>	<b>Ericsson</b>	<b>Nokia</b>	<b>Huawei</b>
2012	\$ 4,852	\$ 3,961	\$ 4,283
2013	\$ 4,932	\$ 2,616	\$ 4,417
2014	\$ 5,315	\$ 2,591	\$ 5,881
2015	\$ 4,134	\$ 2,359	\$ 8,583
2016	\$ 3,702	\$ 5,428	\$ 11,000

**B. Huawei is one of the largest vendors of telecommunications equipment worldwide**

16. Huawei is one of the largest vendors of radio access network or RAN equipment worldwide and, in particular, in Europe. The European Commission reports that in 2014, Huawei had between a 20 percent and 30 percent share of RAN equipment sales globally and between 30 percent and 40 percent in Europe.<sup>22</sup> That remains true today. According to market research firm Dell’Oro, Huawei had 32 percent of global RAN sales as of 4Q 2017, followed by Ericsson with 30 percent and Nokia with 25 percent.<sup>23</sup> In 2017, the industry consulting firm GlobalData ranked Huawei’s Mobile Access infrastructure business as “Very Strong” or “Leader” in all seven of the ranked aspects in its Competitive Index. In particular, GlobalData ranked Huawei’s 2G/3G and LTE RAN product portfolios as “Leaders” in the market, citing “a broad radio unit portfolio and spectrum support” and “advanced antenna solutions.”<sup>24</sup>

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21. Jamie Davies, “Ericsson is losing the R&D game and that needs to change,” telecoms.com, June 5, 2017, <http://telecoms.com/482479/ericsson-is-losing-the-rd-game-and-that-needs-to-change/>.

22. EC Nokia/Alcatel Decision, ¶ 82.

23. Eric Auchard & Sijia Jiang, “China’s Huawei set to lead global charge to 5G networks,” Reuters, February 23, 2018, <https://www.reuters.com/article/us-telecoms-5g-china/chinas-huawei-set-to-lead-global-charge-to-5g-networks-idUSKCN1G70MV>.

24. Ed Gubbins, “Huawei – Mobile Access,” GlobalData, November 15, 2017.

17. Huawei and Ericsson built the first commercial LTE networks in the world in 2009 (for TeliaSonera in Norway and Sweden, respectively).<sup>25</sup> As of 2016, Huawei supplied over half of the 4G and 4.5G networks globally, and has Memorandums of Understanding to trial 5G equipment with many operators, including BT in the United Kingdom, Bell Canada in Canada, Deutsche Telekom in Germany, Orange in France, and Vodafone.<sup>26</sup> Huawei has also previously been called upon to modernize networks in, for example, European countries. For example, Huawei was engaged in 2013 by the Danish telecommunications company TDC to modernize and manage its mobile network, including leveraging LTE, and completed that upgrade in 2015.<sup>27</sup> TDC then engaged Huawei to upgrade its landline hybrid fiber-coaxial cable network to support 1Gbps download speeds.<sup>28</sup> Similarly, Bouygues Telecom in France, citing “past common success” working with Huawei, is deploying its first 5G network trial in Bordeaux with Huawei.<sup>29</sup> Huawei also unveiled a 5G base station and the “world’s first 5G commercial

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25. TeleGeography, “TeliaSonera launches world’s first commercial LTE networks in Sweden and Norway,” December 19, 2009, <https://www.telegeography.com/products/commsupdate/articles/2009/12/14/teliasonera-launches-worlds-first-commercial-lte-networks-in-sweden-and-norway/>.
26. Eric Auchard & Sijia Jiang, “China’s Huawei set to lead global charge to 5G networks,” Reuters, February 23, 2018, <https://www.reuters.com/article/us-telecoms-5g-china/chinas-huawei-set-to-lead-global-charge-to-5g-networks-idUSKCN1G70MV>.
27. TeleGeography, “Huawei completes modernisation of TDC network,” June 3, 2015, <https://www.telegeography.com/products/commsupdate/articles/2015/06/03/huawei-completes-modernisation-of-tdc-network/>. TDC was originally the government-owned incumbent operator in Denmark, but the last state-owned shares were sold in 1998. Anders Henten, “Telecoms in Denmark: Investment, Performance and Regulation,” in *Stimulating Investment in Network Development: Roles for Regulators*, A.K. Mahan and W.H. Melody (eds.), World Dialogue on Regulation for Network Economics, 2005, p. 330.
28. TeleGeography, “Huawei to upgrade TDC’s HFC network to 1Gbps,” January 28, 2016, <https://www.telegeography.com/products/commsupdate/articles/2016/01/28/huawei-to-upgrade-tdcs-hfc-network-to-1gbps/>.
29. TeleGeography, “Bouygues, Huawei to trial 5G in Bordeaux,” February 28, 2018, <https://www.telegeography.com/products/commsupdate/articles/2018/02/28/bouygues-huawei-to-trial-5g-in-bordeaux/>.



chipset.”<sup>30</sup> The European Commission specifically called out Huawei as a “credible alternative” for customers for 4G and 5G equipment when evaluating the Alcatel-Lucent/Nokia merger.<sup>31</sup>

18. Huawei also sells a wide range of other telecommunications infrastructure and services, including all the segments listed in the prior section: wireless handsets, wireless local area networks, passive optical networking, DSL equipment, routers, Ethernet switches, and backbone WDM equipment.<sup>32</sup> Firms offering a wide range of equipment and services may be particularly important competitors in some circumstances. To see why, consider the FTC’s challenge of the US Foods and Sysco merger. This was a merger of two foodservice distribution companies. As the two companies pointed out, there are a huge number of companies distributing food, and those companies collectively have sales much larger than the two parties attempting to merge.<sup>33</sup> However, the FTC responded, and the District Court agreed, that suppliers can differ in important ways beyond just their product offerings. Specifically, the District Court had to define a “product market,” which in economic terms means defining the products and firms that are sufficiently close competitors that they constrain one another’s pricing. The “product” need not be a discrete good for sale.<sup>34</sup> The FTC claimed, and the District Court agreed, that the relevant product market was “broadline” food distribution – characterized by “a vast array of product offerings, private label offerings, next-day delivery, and value-added services” with “geographically dispersed distribution centers” where customers can “make purchases under a single contract that offers price, product, and service consistency across all facilities,” with

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30. Light Reading, “Huawei Unveils 5G-Ready Base Station, New Massive MIMO AAU,” November 20, 2017, <https://www.lightreading.com/mobile/5g/huawei-unveils-5g-ready-base-station-new-massive-mimo-aau/d/d-id/738338>. Arjun Kharpal, “Mobile World Congress – Huawei unveils its first 5G chip in a challenge to Qualcomm and Intel,” CNBC, February 25, 2018, <https://www.cnbc.com/2018/02/25/huawei-unveils-5g-chipset-at-mobile-world-congress.html>.

31. EC Nokia/Alcatel Decision, ¶ 85.

32. See generally Huawei Investment & Holding Co, Ltd. 2017 Annual Report, [http://www-file.huawei.com/-/media/CORPORATE/PDF/annual-report/annual\\_report2017\\_en.pdf?la=en](http://www-file.huawei.com/-/media/CORPORATE/PDF/annual-report/annual_report2017_en.pdf?la=en).

33. United States District Court for the District of Columbia, Memorandum Opinion, Federal Trade Commission, *et al.*, v. Sysco Corporation, *et al.*, Civil No. 1:15-cv00256 (APM), June 29, 2015 (“FTC Sysco Opinion”), p. 19.

34. FTC Sysco Opinion, p. 21.

contracts awarded “through a request for proposal or bilateral negotiations.”<sup>35</sup> The District Court found that although there was no question that smaller firms, niche firms, regional firms, and other types of firms also provided food distribution services, those other firms nonetheless did not constrain the prices of the “broadline” food distributors – that is, they were not in the same relevant economic market.<sup>36</sup>

19. Thus, for customers that particularly desire, or need, one-stop shopping for telecommunications equipment and services, there may be a relatively limited number of firms with appropriately broad portfolios and excluding such a firm may therefore have a disproportionate impact on the competitive landscape. For example, the Gartner Group’s analysis of LTE network infrastructure lists four firms as having a combination of ability to execute and completeness of vision – Ericsson, Nokia, Huawei and ZTE. By contrast, Gartner notes that while Cisco provides some RAN equipment, its portfolio does not include macrocell/microcell base stations, and it cannot fulfill providers’ requirements there.<sup>37</sup>

## **V. ALLOWING HUAWEI TO COMPETE MORE FREELY IN THE UNITED STATES COULD CREATE SIGNIFICANT CONSUMER BENEFITS**

20. The general economic proposition that increased competition benefits consumers is not controversial. Indeed, it is at the heart of the FTC’s mission, and FTC guidance to legislators and others on how best to preserve or increase competition while addressing any relevant national security concerns would be helpful. Consumer benefits from increased competition can be particularly large in highly concentrated industries. The question here is how significant are the benefits likely to be if Huawei were permitted to compete for the business of U.S. carriers, or, conversely, how significant is the impact of excluding a competitor from the U.S. by regulatory fiat.

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35. FTC Sysco Opinion, pp. 18-19, 41.

36. FTC Sysco Opinion, pp. 18-41.

37. Kosei Takiishi, Sylvain Fabre, Peter Liu, Frank Marsala & Jessica Ekholm, “Magic Quadrant for LTE Network Infrastructure,” Gartner, July 31, 2017, pp. 1-3.

**A. Bidding by Huawei has brought down prices in areas where it is allowed to compete**

21. Huawei currently has low sales shares in the United States. However, it is not necessary for Huawei to gain significant sales in order to benefit consumers in the United States. As the European Commission has noted, given large contracts, firms can provide competitive benefits even if they have low shares of sales, simply because they provide credible alternatives and participate in the bidding process.<sup>38</sup> Anecdotally, prior to the 2012 House report on Huawei and ZTE, Huawei's presence in the bidding process provided competitive pressure that helped U.S. carriers obtain better terms from Ericsson and Alcatel-Lucent.<sup>39</sup>

Over the last few years, U.S. mobile industry has undergone a big transformation, building its next generation of LTE mobile networks. ... Huawei bid on all of those [U.S.] contracts, but except for a WiMAX deal with Clearwire and a few minor networks with regional providers, it failed to win any of them. Every analyst and industry insider I've talked to, however, said that Huawei's presence was felt during those negotiations. Established vendors were forced to underbid Huawei or risk losing key contracts. A deal with a nationwide U.S. operator is a marquee deal, involving billions of dollars and tens of thousands of cellsites. To lose a nationwide U.S. contract to Huawei would be a major black eye for an Ericsson.

22. The Chief Technical Officer of the Canadian carrier Telus recently made the same point, stating that "One of the great things about Huawei being in the market is they have dropped prices by 15% at least. ... They forced the Ericssons and Nokias to follow suit."<sup>40</sup> Such a result would not be surprising in a highly concentrated industry. That is, given a small number of credible alternatives for carriers to purchase telecommunications infrastructure from, the addition of one or more new credible alternatives can be expected to improve competition. Conversely, excluding one or more of a small number of credible alternatives from a market can be expected

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38. EC Nokia/Alcatel Decision, ¶¶ 18, 87, 96.

39. Kevin Fitchard, "Why the US needs Huawei more than Huawei needs the US," GigaOm, May 31, 2013, <https://gigaom.com/2013/05/31/why-the-us-needs-huawei-more-than-huawei-needs-the-us/>.

40. Iain Morris, "Telus CTO: NFV Burden May Cripple Telcos," LightReading, May 14, 2018, [https://www.lightreading.com/carrier-sdn/nfv-\(network-functions-virtualization\)/telus-cto-nfv-burden-may-cripple-telcos/d/d-id/743076](https://www.lightreading.com/carrier-sdn/nfv-(network-functions-virtualization)/telus-cto-nfv-burden-may-cripple-telcos/d/d-id/743076).

to reduce competition – as noted above, there is a presumption in the Horizontal Merger Guidelines that such effects will occur in a concentrated market.

**B. Small U.S. carriers that use Huawei have reported obtaining better service and lower prices**

23. Although large national carriers such as AT&T and Verizon could benefit from increased competition in mobile infrastructure, Huawei has also been serving dozens of small and rural carriers who could lose access to its equipment and services as a result of the FCC proceeding or legislation.<sup>41</sup> The Wall Street Journal reports that “many regional American providers of wireless, TV and internet services have flocked to Huawei, attracted by what they say are Huawei’s cheaper prices, quality products and attentive customer service.”<sup>42</sup> For example, Huawei upgraded Union Wireless’s Rocky Mountain based territory to LTE. Union Wireless reported that Huawei’s “smooth upgrade, upgraded service offering and Huawei support [were] key to Union’s success.”<sup>43</sup>

24. Further evidence is provided in declarations submitted by rural carriers noting in the FCC proceeding that their networks are comprised largely or entirely of equipment purchased from Huawei, and that if they lost access to that vendor they would have to “rip and replace” the network. Indeed, one of the commenting rural carriers notes that the only vendor that responded

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41. Phil Goldstein, “Huawei exec: We treat Tier 3 U.S. carriers like they’re the ‘belle of the ball,’” FierceWireless, March 27, 2015, <https://www.fiercewireless.com/wireless/huawei-exec-we-treat-tier-3-u-s-carriers-like-they-re-belle-ball>.

42. Drew Fitzgerald and Stu Woo, “In U.S. Brawl With Huawei, Rural Cable Firms Are an Unlikely Loser,” The Wall Street Journal, March 27, 2018, <https://www.wsj.com/articles/caught-between-two-superpowers-the-small-town-cable-guy-1522152000>.

43. RCR Wireless News, “Case study: Huawei enables rural carriers to compete,” September 22, 2016, <https://www.rcrwireless.com/20160922/carriers/case-study-huawei-enables-rural-carriers-compete>.

to its request for proposal for its network was Huawei.<sup>44</sup> And they all note that they received better terms and service as a result of Huawei's bidding for their business.<sup>45</sup>

- SI Wireless states that the majority of its network has been constructed with Huawei equipment, chosen because of its cost-effectiveness, excellent quality, and excellent customer service, and that prohibiting Huawei equipment and services would require SI Wireless to replace that network at a cost of \$40 to \$60 million.<sup>46</sup>
- NE Colorado Cellular states that roughly 80 percent of equipment in its network comes from Huawei, chosen because it was the most cost-effective option with the most reliable product and had excellent customer service. Prohibiting Huawei equipment and services would require NE Colorado Cellular to "rip and replace" much of its network at a cost of more than \$400 million. NE Colorado Cellular also noted that it would expect additional and ongoing servicing costs from installing inferior equipment with less responsive customer service from other equipment manufacturers.<sup>47</sup>
- James Valley Telecommunications states that 100 percent of its wireless core network and wireless radios are from Huawei, that it obtained 40 percent savings relative to the next most cost-effective option, and that prohibiting Huawei equipment and services would require replacement equipment of roughly \$5,000 per customer. Given roughly 10,000 predominantly rural customers, all of whom James Valley Telecommunications provides LTE service to using Huawei equipment, that yields \$50 million in replacement costs.<sup>48</sup>

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44. Declaration of Eric J. Woody, Union Telephone Company, attached to Comments of Competitive Carriers Association, June 1, 2018, ¶ 3.

45. CCA Comments, WC Docket No. 18-89, June 1, 2018, attached declarations.

46. Declaration of Michael Beehn, SI Wireless LLC, attached to CCA Comments, WC Docket No. 18-89, June 1, 2018, ¶¶ 4-5.

47. Declaration of Frank DiRico, NE Colorado Cellular, attached to CCA Comments, WC Docket No. 18-89, June 1, 2018, ¶¶ 3-4.

48. Declaration of James Groft, James Valley Telecommunications, attached to CCA Comments, WC Docket No. 18-89, June 1, 2018, ¶¶ 2-4.

- United Telephone Association states that its wireless network consists primarily of Huawei equipment, which was technically superior to other options and was “by far” the most cost effective.<sup>49</sup>
- Nemont Telephone Cooperative states that over 70 percent of its wireless network comes from Huawei, and that it chose Huawei because of its technical capabilities, customer support, and cost effectiveness. Prohibiting Huawei equipment and services would require it to undertake network replacements costs of around \$57 million, and there would likely be higher costs of materials, support and upgrades going forward.<sup>50</sup>
- Union Telephone Company states that roughly 75 percent of its network equipment comes from Huawei. It also states that Huawei was the only vendor to respond to its request for proposal after the previous vendor was found to be unsatisfactory, and that Huawei is highly cost-effective and provides excellent customer service. Union Telephone Company estimates the costs of the FCC’s proposed rule to be around \$340 million in direct, “start-up” costs, with ongoing higher service costs and decreased quality.<sup>51</sup>

**C. Increased competition in telecommunications infrastructure would benefit the U.S. economy**

25. Increased competition to provide equipment can provide many benefits to U.S. carriers and to U.S. consumers generally, including lower prices, higher quality and greater innovation. Indeed, basic economics teaches that increased competition to supply inputs such as telecommunications infrastructure will increase investment in such infrastructure.<sup>52</sup>

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49. Declaration of Todd Houseman, United Telephone Association, Inc., attached to CCA Comments, WC Docket No. 18-89, June 1, 2018, ¶ 3.

50. Declaration of Michael Kilgore, Nemont Telephone Cooperative, Inc., attached to CCA Comments, WC Docket No. 18-89, June 1, 2018, ¶¶ 2-3.

51. Declaration of Eric Woody, Union Telephone Company, attached to CCA Comments, WC Docket No. 18-89, June 1, 2018, ¶¶ 3-5.

52. That is, demand curves are assumed to slope downwards, so if increased competition reduces quality-adjusted prices for infrastructure equipment, carriers will purchase more

26. The benefits to the broader economy of increased investment in telecommunications infrastructure can be enormous. The GSM Association, for example, has estimated that the direct economic contribution of the mobile ecosystem to GDP globally for 2017 was roughly \$1.1 trillion, the indirect impact was roughly \$0.5 trillion and the productivity impact was roughly \$2 trillion, contributing, in total, roughly 4.5 percent of global GDP.<sup>53</sup> The FCC’s National Broadband Plan notes that, “[l]ike electricity a century ago, broadband is a foundation for economic growth, job creation, global competitiveness and a better way of life. It is enabling entire new industries and unlocking vast new possibilities for existing ones.” However, the Plan also notes that “broadband in America is not all it needs to be,” and discusses ways to improve investment, including reforming “current universal service mechanisms to support deployment of broadband....”<sup>54</sup> Policy makers should take note of the potential impact on infrastructure costs of excluding significant competitors from the U.S. market. The Wall Street Journal, for example, reports that Huawei “has been actively courting small-town internet companies that wanted to replace old-fashioned landlines with high-speed internet connections—no small feat in a country where most rural residents are stuck with dial-up speeds. ... Many of these customers now worry the new heat over Huawei in Washington may rob them of what has so far been an important alternative to Western suppliers. Others worry that if Huawei exits the U.S. completely, it will leave them without the customer and technical support they need to maintain the Huawei hardware they already own.”<sup>55</sup> Deloitte has recently issued a white paper claiming that the U.S. is lagging behind other countries in 5G deployment due in part to “higher costs relative to other countries.” Deloitte calls for policy makers to consider ways to reduce those costs, which would contribute to “help[ing] remove a major obstacle to network densification

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of it.

53. GSM Association, “The Mobile Economy 2018,” <https://www.gsma.com/mobileeconomy/wp-content/uploads/2018/05/The-Mobile-Economy-2018.pdf>, pp. 27-28.
54. Federal Communications Commission, “Connecting America: The National Broadband Plan,” March 17, 2010, <https://transition.fcc.gov/national-broadband-plan/national-broadband-plan.pdf>, pp. xi, 9.
55. Drew Fitzgerald and Stu Woo, “In U.S. Brawl With Huawei, Rural Cable Firms Are an Unlikely Loser,” The Wall Street Journal, March 27, 2018, <https://www.wsj.com/articles/caught-between-two-superpowers-the-small-town-cable-guy-1522152000>.

and allow[ing] carriers to add desperately needed low-cost capacity to our nation's wireless networks."<sup>56</sup>

27. Economists have also studied the impact of faster or slower deployment of telecommunications technologies. For example, Robert Crandall and Charles Jackson have evaluated the impact on the U.S. economy of faster roll-out of broadband access, including both wireless and landline, and concluded that the benefits are enormous.

Although it will take many years, the widespread adoption of broadband access service will bring enormous economic benefits to our economy. No doubt many of the impacts cannot be foreseen. But some benefits can. ... A faster rollout of high-speed access services gives us these benefits earlier. Under optimistic – but still reasonable – scenarios the net present value of a faster rollout of high-speed access could be as high as \$700 billion, and a mid-range estimate of the value of faster rollout is \$500 billion.<sup>57</sup>

28. The general proposition that delaying the introduction of new goods or services can be very costly to consumers and the economy is well accepted in economics. Jerry Hausman has analyzed the impact of FCC regulatory delays on the introduction of cellular service in the first place, stating that the FCC did not adequately consider the costs to consumers in its proceedings.

The consumer welfare cost of holding up the introduction of a new good is much larger than the effects of higher prices or other regulatory effects on demand... Looked at another way, the introduction of cellular has created significant value for consumers. Thus, new telecommunications services can improve consumer welfare by very large amounts. Regulatory delay can therefore have potentially large negative effects on the U.S. economy.

Again the possible question arises of why the FCC created such a large amount of harm to U.S. consumers and the U.S. economy. The FCC was confronted with a very difficult decision with respect to cellular. Delaying a difficult decision appeared to be the FCC's chosen response. Losses in consumer welfare arising

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56. Dan Littmann, Phil Wilson, Craig Wigginton, Brett Haan and Jack Fritz, "5G: The chance to lead for a decade," Deloitte, 2018, <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/technology-media-telecommunications/us-tmt-5g-deployment-imperative.pdf>, p. 9.

57. Robert Crandall and Charles Jackson, "The \$500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access," in Down to the Wire: Studies in the Diffusion and Regulation of Telecommunications Technologies, Allan Shampine (ed.), Nova Science Publishers, 2003, p. 184.



from the regulatory delay did not appear to be involved in the FCC's regulatory approach. Indeed, if cellular service had not begun in other countries, which helped create pressure for the FCC to finally come to a decision, it is quite likely that the advent of cellular telephone service would have delayed for an even greater period in the U.S.<sup>58</sup>

29. Five members of the Competitive Carriers Association discussed above estimated that those five alone would face costs around \$900 million if Huawei were excluded entirely from competing in the United States. They were commenting in the FCC proceeding, but their concerns were about the exclusion of their chosen vendor from the U.S. generally. They also all note that they received lower prices because of Huawei's competing for their business. One reported a 40 percent reduction in prices.<sup>59</sup> The GSM Association estimates carrier capital expenditures in North America for 2017 to 2020 to reach around \$136 billion.<sup>60</sup> A 15 percent savings on that total from allowing Huawei to compete freely would amount to \$20 billion. Note that this is just for wireless infrastructure. Huawei is also a significant provider worldwide in other areas that are highly concentrated in the United States, including smartphones, wireline infrastructure, and enterprise equipment and services, and increased competition in these other areas would create additional benefits.

30. Given the prospect of massive 5G investment and deployment over the next few years, additional competition in the provision of 5G infrastructure equipment could be a benefit to both U.S. carriers and U.S. consumers. Policy makers should consider carefully the costs of excluding significant global competitors from the U.S. market, global competitors that have helped build, and are continuing to supply, telecommunications carriers throughout the rest of the world, including throughout Canada and Europe. FTC guidance to legislators and others on how to craft remedies to preserve competition while addressing any relevant national security concerns would be helpful.

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58. Jerry Hausman, "Mobile Telephone," in Handbook of Telecommunications Economics, Vol. 1, Martin Cave, Sumit Majumdar and Ingo Vogelsang (eds.), North-Holland, 2002, p. 591.

59. See ¶ 24, *supra*.

60. GSM Association, "The Mobile Economy North America 2017," <https://www.gsmainelligence.com/research/?file=b0cf4f71cb2d035f429d9de8ca4fc72e&download>, p. 6.