Before the
BUREAU OF INDUSTRY AND SECURITY
Washington, DC 20230

In the Matter of		
	)	
Risks in the Semiconductor Manufacturing	)	Docket No. 210310-0052
and Advanced Packaging Supply Chain	)	RIN- 0694-XC07

COMMENTS OF THE
TELECOMMUNICATIONS INDUSTRY ASSOCIATION

The Telecommunications Industry Association ("TIA")[1] welcomes this opportunity to comment on the Request for Comment from the Department of Commerce Bureau of Industry and Security (BIS) regarding Risks in the Semiconductor Manufacturing and Advanced Packaging Supply Chain. This is an area of substantial interest to TIA, as TIA represents hundreds of global manufacturers and vendors of ICT equipment and services from some of America's largest semiconductor companies; to global manufacturers of handsets, base stations, and routers; to companies that design and deploy satellite internet services. TIA member companies are the backbone of the global internet, supplying the products that allow people around the world to stay connected even as America beats back the COVID-19 pandemic.

Semiconductors are a foundational part of the technology stack for the ICT sector, powering the computation that enables ICT devices to connect people to the goods, services, and information they need. Given the importance of this technology, it is indeed important that the United States is able to consistently source high-quality semiconductors even when pandemics,

[1] TIA is the leading trade association for the information and communications technology ("ICT") industry, representing companies that manufacture or supply the products and services used in global communications across all technology platforms. TIA represents its members on the full range of policy issues affecting the ICT industry and forges consensus on voluntary, industry-based standards.

security conflicts, or other external factors disrupt global trade. As the government considers action pursuant to this report, **TIA recommends that the focus be on providing positive incentives for semiconductor manufacturing and design instead of using the power of government to divert chip production toward any specific end use**. Government intervention in favor of any one particular end use will necessarily adversely impact other industries by diverting supply from other end uses, including the ICT equipment sector that TIA represents. This would have a substantial negative impact on the American economy by:

- Slowing long-term economic growth by impacting the roll-out of next-generation networks.
- Exacerbating long-term racial and economic inequality, including widening the "homework gap" that has left some children without access to school resources or reliable internet; and
- Harming efforts to respond to the COVID-19 pandemic by making efforts to expand internet access more costly and increasing the costs of certain products – including medical devices, equipment used by first responders, and WiFi routers – that use chips.

Action favoring a particular sector also has the potential to impose a direct cost on America's innovative semiconductor manufacturers and designers by distorting the market toward end uses that generate lower revenues and creating uncertainty in the chip market more broadly by introducing questions about whether market mechanisms or government action will determine semiconductor sales. Imposing these costs and uncertainty on an industry that requires substantial forward investment in R&D is not in the U.S. national interest, particularly in the context of U.S. companies racing against state-funded, global competition from America's strategic competitors.

I. AMERICA'S POSITION IN THE GLOBAL SEMICONDUCTOR VALUE CHAIN

The semiconductor supply chain is extremely complex – the production of a single chip can require more than 1,000 discrete steps passing through borders 70 or more times before the chip meets the end consumer.[2] In general terms, the semiconductor supply chain includes a number of broad segments including research and development, production, production inputs and distribution for end use. Research and development underpins each of these segments, and the United States is in the advantageous position of being a global leader with respect to semiconductor R&D.[3] Additionally, the United States has a strong position with respect to semiconductor design. Semiconductor design is foundational to the entire supply chain; if a design is compromised then the semiconductors and all subsequent associated hardware and software will be compromised as well. The need to maintain comparative U.S. strengths across these two core elements should be an important consideration in the context of the evaluation of the broader semiconductor supply chain.

The relative lack of semiconductor fabrication facilities in the United States also merits government attention. While the U.S. does indeed have something around 11% of global semiconductor manufacturing capacity, this production capacity is not sufficient to support the variety of end uses required to remain sufficiently resilient through external demand or supply shocks.[4] This lack of domestic fabrication facilities is at the root of why TIA supports measures

---

[2] Accenture, *Globality and Complexity of the Semiconductor Ecosystem* (February 21, 2020), https://www.accenture.com/_acnmedia/PDF-119/Accenture-Globality-Semiconductor-Industry.pdf.

[3] Saif M. Khan, Alexander Mann, and Dahlia Peterson, *The Semiconductor Supply Chain: Assessing National Competetiveness* (January, 2021), https://cset.georgetown.edu/wp-content/uploads/The-Semiconductor-Supply-Chain-Issue-Brief.pdf

[4] Congressional Research Service, *Semiconductors: U.S. Industry, Global Competition, and Federal Policy*, (October 26, 2020), https://crsreports.congress.gov/product/pdf/R/R46581

such as the CHIPS for America Act to further incentivize the establishment of additional U.S. semiconductor foundries.

As the U.S. government approaches discussions regarding the implementation of any incentives program, it is important to keep in mind that U.S. companies require access to a wide range of different chipsets – 150nm, 95nm, 65nm, 40nm, 14nm, and below. Sustaining supply availability and flexibility is key to American economic competitiveness and sustainability, both as it applies to leading edge fabrication abilities and access to an adequate supply of legacy nodes. Indeed, the focus on supply for leading edge nodes over legacy nodes is a contributing factor to shortages in the automotive sector, which has suffered from underinvestment due to the depreciation of investments in fabs over time and comparatively low returns on legacy chips.[5]

II. CHIP SUPPLY CHAIN CONSTRAINTS AND DOWNSTREAM IMPACTS ON THE ICT SECTOR

The global semiconductor shortage has had a substantial impact on the technology sector. Telecommunications alone drives 33% of all demand for semiconductors. Combined with the demand for computers (28.5%) and for consumer electronics (13.3%), the majority of global semiconductor manufacturing capacity is used by the ICT sector.[6]

At the same time, the COVID-19 pandemic has had a pronounced impact on the broader ICT supply chain. On the demand side, the switch to distance education for kids and work-from-home for many workers created an unanticipated demand shock for some home ICT products. As an example, computer sales skyrocketed throughout 2020, increasing by 11.2% in Q2, 14.6% in

[5] Syed Alam, *Chip Shortages Impact for Supply Chain Resiliency*, Accenture, (March 12, 2021) https://www.accenture.com/us-en/blogs/high-tech/chip-shortages-impact-for-supply-chain-resiliency
[6] Semiconductor Industry Association, *2020 State of the Industry Report,* (July 2020), https://www.semiconductors.org/wp-content/uploads/2020/06/2020-SIA-State-of-the-Industry-Report.pdf

Q3, and 23.4% in Q4 on a year over year basis according to industry research firm IDC.[7] On the supply side, ICT supply chains across the world were impacted by the spread of the pandemic which affected travel patterns, working conditions, and the health of the ICT workforce.

The net impact of the semiconductor shortages and the global has been supply shortages, increasingly long lead times in production, and delays in delivery across a number of segments of the ICT sector. To be more specific, industry notes that the semiconductor shortage has delayed the development cycle for broadband-related products from a 16-20 week delay in the production cycle to a **50-week delay** in the product development cycle. Additionally, companies note that the semiconductor shortage will lead to a **3-5% cost increase** to suppliers. These delays have the potential to impact public and private investments in network infrastructure at a time when the federal government is planning historic investments in broadband networks.

III. ESSENTIAL NATURE OF CONNECTIVITY TO AMERICA'S ECONOMIC FUTURE, COVID RESPONSE

As the government considers intervention in the ICT supply chain, TIA recommends that authorities keep in mind the essential nature of connectivity to the global response to the COVID-19 pandemic and to America's long-term economic future. To the extent that the government takes action – either through positive incentives or through direct regulation – connectivity will be impacted, with possibly significant consequences for end users. The following are some key reasons why the government should carefully consider the downstream impact on the ICT sector:

[7] International Data Corporation, *Worldwide Quarterly Personal Computing Device Tracker*, (April 4, 2021, 6:29 PM) https://www.idc.com/tracker/showproductinfo.jsp?containerId=IDC_P36344

a. Connectivity is vital to the global response to COVID-19

Given the ongoing nature of the crisis, the cost of the COVID-19 pandemic in both human lives and in terms of economic activity is incalculable. Over the course of the pandemic, telecommunications equipment has supported COVID-19 response efforts by:

- Facilitating the maintenance of communications networks and providing equipment used by first responders;
- Supporting operations within and between hospitals and medical centers;
- Enabling the deployment of telehealth applications;
- Supporting remote work, thereby allowing more people to enact social distancing and other prophylactic measures;
- Using Wi-Fi hotspots in public areas to bridge at-home service gaps;
- Powering remote education as schools closed to stem transmission of the virus; and
- Facilitating efforts to track disease vectors.

The U.S. government itself has recognized and supported ICT's role in virus mitigation efforts through the following actions in Congressionally authorized COVID relief packages and through direction action by executive agencies under both the Biden and Trump administrations including the following:

- The DHS Cybersecurity and Infrastructure Security Agency (CISA) has designated the Communications and IT sectors as critical infrastructure that is essential to combating the COVID-19 emergency.
- In the CARES Act, Congress allocated $200 million to a COVID-19 telehealth program designed to relieve strain on hospitals by transitioning more healthcare services to remote applications. Using this funding, the Federal Communications

Commission (FCC) established a dedicated telehealth program provider to provide connected care services to patients at their homes or at mobile locations. Program funding was used to provide eligible health care providers support to purchase telecommunications, information services, and connected devices necessary to provide telehealth services to patients.

- The FCC acted to increase broadband availability, provide regulatory support to providers of conference calling services, and enable the use of additional spectrum by first responders.
- The HEROES Act established a $4 billion fund to provide a monthly discount of up to $50 to low-income households and those impacted by COVID-19, as well as reimbursement for providers who provide connected devices up to $100.
- The HEROES Act provided $1.5 Billion for Connectivity and Devices for Students Without Broadband Access.
- The HEROES Act expanded of Broadband Connectivity Subsidies for Health Care Providers by dedicating $2 billion in connectivity subsidies for healthcare providers.
- The American Rescue Plan Act (ARP) of 2021 included $7.17 billion for an Emergency Connectivity Fund to enable remote learning.

To the extent that the administration takes action pursuant to this report that favors particular end uses, it runs the risk of acting at cross purposes to the programs established by Congress and enacted by successive administrations to make broadband internet access more broadly available during the COVID crisis.

Network operators have also stepped up to support access during the COVID pandemic. More than 800 companies and associations, including TIA, signed the FCC's "Keep America

Connected" pledge in March of 2020.[8] As part of this pledge, these companies pledged to not terminate services to any residents or small businesses, waive any late fees related to economic hardships caused by the pandemic, and open Wi-Fi hotpots to Americans in need. By taking this pledge, these ICT companies added much needed security and connectivity at a time where Americans were facing an unprecedented shift to working and learning remotely.

b. Connectivity is Key to America's Economic Future

While the pandemic has made the importance of connectivity clear, the deployment of high-speed next generation networks will remain center to America's economy even after the country returns to a "new normal." When America won the race for 4G, the U.S. experienced a boom in economic development as a result that lasted over a decade.[9] While the benefits of the U.S. speed in adopting 4G technologies cannot be understated, the deployment of nationwide 5G networks and next generation networks is expected to usher in an even greater economic impact.

According to industry reports, the deployment of nationwide 5G will increase the U.S. Gross Domestic Product by $1.5 trillion in the next five years alone.[10] The impact of 5G will hit most sectors of the economy, with industry figures showing that for every ICT sector job created will produce a multiplier effect that creates 1.8 additional jobs throughout the economy.[11] The effect of this multiplier means that early adoption of 5G technology has the potential to create or transform up to 16 million jobs across all sectors of the economy.[12] These jobs will be created

---

[8] U.S. Federal Communications Commission, *Keep Americans Connected*, (April 4, 2021, 6:39 PM), https://www.fcc.gov/keep-americans-connected

[9] Recon Analytics, *How America's 4G Leadership Propelled the U.S. Economy*, Cellular Telecommunications Industry Association, (Apr. 16, 2018), https://api.ctia.org/wp-content/uploads/2018/04/Recon-Analytics_How-Americas-4G-Leadership-Propelled-US-Economy_2018.pdf

[10] Jefferson Wang, Hillol Roy, Syed Alam, Tejas Rao, Samir Ahshrup, William McCluskey, *The Impact of 5G on the United States Economy*, Accenture Strategy (Feb. 22, 2021) (*available at* https://www.accenture.com/us-en/insights/high-tech/5g-economic-impact).

[11] *Id.*

[12] *Id.*

nationwide, providing Americans jobs in both rural and urban states working to further connect the country.[13] Given the significant economic impact of 5G deployment, it is vital that the government thoroughly consider the downstream impacts on the network equipment sector when adopting policies that impact the semiconductor supply chain.

IV. POLICY RECOMMENDATIONS

At a high level, TIA's primary recommendation is that U.S. government action pursuant to this report should focus on providing **positive incentives for semiconductor manufacturing and design instead of intervening to divert chip production toward any specific end use.** More specifically, TIA recommends that the administration consider some of the following policy measures:

1. ***ENSURE PREDICTABLE, MARKET-DRIVEN DEMAND***

   Government action should focus on providing incentives to support U.S. semiconductor leadership through technology-neutral policies that do not support any one end use over another. Acting to support any one particular end use will weaken market incentives in an innovative, R&D intensive sector that needs more, not less, predictability as it considers deeper investments in the United States.

2. ***WORK WITH CONGRESS TO PASS AND FUND THE ENDLESS FRONTIER ACT, USA TELECOMMUNICATIONS ACT, AND THE CHIPS FOR AMERICA ACT***

   These bills each contain vital proposals to encourage deeper investments in American innovation and American manufacturing. In the context of the semiconductor shortage, the onshoring of advanced fab capabilities is particularly important, as is ensuring adequate legacy node supply. We applaud President Biden's call for $37B for the semiconductor sector and a call for grants and tax incentives (ITC and ARC) to be sustained over the next five years, and we encourage the administration to work with Congress to bring the funding for these initiatives across the finish line.

3. ***EXPAND R&D INCENTIVES TO INCLUDE U.S. SEMICONDUCTOR DESIGN LEADERSHIP***

[13] *Id.*

The CHIPS Act acknowledges that targeted incentives are needed to incentivize the U.S. semiconductor, but does not cover design and R&D. Given the foundational nature of design and R&D to the semiconductor process and the strong ties between these elements and the manufacturing process, TIA urges the administration to consider ways to expand R&D incentives to include the design process.

4. ***SET CLEAR NATIONAL SECURITY PRIORITIES WITH INDUSTRY CONSULTATION***

With more than 80% of U.S. semiconductor sales occurring overseas, access to global markets is critical.[14] That revenue fuels R&D in the United States, and the ability of U.S. industry to lead is directly tied to its ability to sell abroad. This includes sales to China, which is the largest single external market for U.S. semiconductor companies. As the Biden administration charts its path forward with respect national security restrictions on trade, TIA recommends that action be tied to clear security objectives, that national security controls be pursued multilaterally where appropriate to prevent other countries from simply "backfilling" the void left by restricted U.S. exports, and that future restrictions be considered in consultation with industry to ensure that regulation has its intended effect. Additionally, a return to timely processing of relevant license applications is essential to the ability of U.S. semiconductor companies to be reliable suppliers to their customers.

5. ***STABILIZE AND EXPAND VISA PROGRAMS THAT SUPPORT HIGH-SKILL ICT WORKERS***

As companies consider expanding their investments in the U.S., they need access to a large, specialized, and high-skill engineering workforce. Liberalizing immigration rules by stabilizing and expanding the H1B visa program for high-skilled immigrants would allow firms to grow the non-immigrant ICT workforce, expand production, making America more globally competitive.

6. ***MAINTAIN A COMPETITIVE, INVESTMENT-FRIENDLY TAX CODE***

The ICT sector generally, and the semiconductor sector specifically, rely on a competitive tax code to support long-term investments in the United States. The administration should support common-sense tax measures to promote U.S. investment and R&D, including by continuing the investment tax credit, extending immediate expensing for the R&D tax credit instead of amortizing benefits over time, and avoiding unnecessary increases in the baseline corporate tax rate.

7. ***BUILD STRONG TECHNOLOGY ALLIANCES WITH AMERICA'S GLOBAL PARTNERS***

[14] Semiconductor Industry Association, *2020 State of the Industry Report,* (July 2020), https://www.semiconductors.org/wp-content/uploads/2020/06/2020-SIA-State-of-the-Industry-Report.pdf

America's global partners and allies play a vital role in America's ICT networks, from semiconductors, to base stations and routers, all the way down to user terminals. Particularly as the U.S. works to level the playing field against state-funded, global competitors, cooperation with allies will be an important part of any comprehensive strategy. Structures like the Quad Technology Working Group and the proposed EU-US Trade and Technology Council are likely to be useful convening structures for bilateral and multilateral cooperation on this front. Additionally, Congressional proposals such as the Democracy Technology Partnership Act provide useful recommendations regarding how the State Department can more effectively work with other parts of the U.S. government to promote tech cooperation with America's trusted allies and partners.

V. CONCLUSION

TIA's position representing the telecommunications sector – the largest end user of semiconductors – gives us a unique vantage point to provide input regarding the current chip shortage and the impact on America's networks. We appreciate the opportunity to provide input to the administration on this topic, and we look forward to additional opportunities to support the development of effective policies in this area.

Patrick Lozada
Director, Global Policy

TELECOMMUNICATIONS INDUSTRY ASSOCIATION
1310 N. Courthouse Road
Suite 890
Arlington, VA 22201
(703) 907-7700

Filed: April 5, 2020